

SCIENCE AND THE RELIGIOUS LIFE

*A Psycho-Physiological
Approach*

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NEW HAVEN: YALE UNIVERSITY PRESS
LONDON: HUMPHREY MILFORD: OXFORD UNIVERSITY PRESS

1928

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PREFACE

“Not to add one more voice to the noise of controversies, but to spell, in part, the runes of these, our days.”

THE present essay manifestly touches the high things of human striving. Nothing that may be said, by way of preface, with reference to intention or credentials, can supply the warrants for such an undertaking; such warrants, to be living, must reside, and be discovered by the reader, in the work itself.

With reference to procedure, however, attention may be called to three points. The first is the use of the postulate of *organic evolution* as a heuristic principle; the second is the employment of the *methods of psychology* for discovering the points at which the physiological changes, implied in this postulate, may occur; and the third is the use of the *data of human history* as material for applying these psychological methods under the guidance of this heuristic principle.

In such an application of the principle, attention comes once more to be directed to the psychophysiological prospects of humanity, while the retrospective question of biological origins falls into the background. Since the closing decade of the last century, Biologic Finalism, which avers that the process of organic evolution has come to its natural term in the human species, has insidiously intruded itself as a basal working hypothesis into the sciences dealing with man. In thus neglecting certain major implications of the doctrine of evolution, our contemporary world has failed to enter into possession of the power and the freedom that Naturalism potentially holds for the human spirit. The first step toward that possession is a consistent utilization of the postulate of organic evolution not merely as an explanatory principle but as a principle of quest.

As to the method of psychological analysis, a word may be said with a view to removing the difficulties, more apparent than real, which have arisen out of the contemporary issue as to whether it is experience or organic behavior that constitutes the proper field of psychology as a science. Without entering into that controversy, we may point to the well-defined program of physiological psychology which offers a methodology, steadily perfected since the days of Weber and Fechner, that has been increasingly fruitful in augmenting our knowledge of man. Under the ægis of this discipline the study of experience and the study of organic processes, going hand in hand, have not only mutually illumined one another but have developed also tools for prognosis and control. This being the case, psychological analysis may be expected first to point to the locus of further possible organic evolution within the system of physiological processes in man, and secondly to give some intimations of the nature of such possible changes in the general patterning of these organic functions, which are the root of human character and personality.

And finally, as we have observed, our procedure applies this method of psychological analysis to the facts of human history. It is the standpoint of the present essay that events of history, when translated into the processes of psychology and physiology, may become the basis for a scientific study of that human experience and that human behavior which constitute the content of civilizations. So far as such analysis does not fall into the error of facile teleologizing—the rock on which attempts to achieve a science of social processes in sociology, economics, and *Kulturgeschichte* have always foundered—it may effectually bring the facts of human history into the general perspective of the natural sciences.

When this procedure is consistently carried out, we

shall be realizing the program of a thoroughgoing comparative psychology with respect to man. The critical situations of human history will then take on a new significance, for they will be seen to partake of the character of ecological crises which touch man's nature to the very quick. Just as the great changes of geological eras give rise to the far-reaching anatomical and physiological modifications represented in the biological family-tree, so the crises of human civilizations affect similarly the physiological processes in man by disturbing their balance so profoundly as to call out widespread and often radical reorganization. On the hypothesis of organic evolution, it is here that we may look for the possibility of a changed humanity. In inquiring into the nature of such a possible change, a psychophysiological study of the attitudes basic to the acquisition of knowledge and to the religious life promises to be fruitful of results; for it is at these points that human experience and behavior bear the marks of organic adjustment. Such an inquiry—it may be said in passing—interested as it primarily is in the character of possible organic modifications, is not directly concerned with the question of physiological heredity.

Only a beginning has been made; but we believe that the foundations are firmly laid and that—if we may without presumption change to a figure at once more vital and more ancient—the ground is here tilled about the roots of that tree whose leaves shall be for the healing of the nations.

C. R.

Loch Mirror Park,
Baraboo, Wisconsin,
May, 1926.

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SCIENCE AND THE RELIGIOUS LIFE

I.

RETROSPECT AND PROSPECT

IT is now thirty years ago that Mr. Balfour wrote his *Foundations of Belief*.¹ Here was a sincere attempt at an appraisal of the probable effect of the new Naturalism upon the spiritual and moral life of the times. The doctrine of evolution had been successfully launched. Men like Huxley, Tyndall, Spencer, and Fiske had labored indefatigably in placing the naturalistic doctrine in the limelight. Upheld by a fine enthusiasm for science, they fought its battles and defended it from the attacks of those who would not or could not summon the vision requisite for understanding the scientific spirit.

Despite much opposition, the new biological envisagement held its own and began to make itself manifest in the literature and the thinking of those days. Gradually also it made itself felt, and that necessarily, in the working principles of human conduct. The old sanctions of conduct were undeniably weakened, and a naturalistic vocabulary soon developed among the people, which often offended the sensibilities of those who still clung to the transcendental sanctions. The category of 'fitness,' defined in terms of 'survival,' was a stumbling block to some, while it lent zest to others who gloried in the frank envisagement of human life as a 'struggle for existence' in which the strong or cunning conquer. There were, to be sure, also some noteworthy efforts, like those of George Eliot, to invest the new naturalistic viewpoint with a flavor of heroic worth—but as some have remarked, the effect is somewhat like that of the small boy whistling in the dark.

¹ Balfour, A. J.: *The Foundations of Belief*, London, 1895.

It was these trends and these endeavors that the young Mr. Balfour had opportunity to witness at first hand in later nineteenth-century England, and out of his observation grew his essay. He saw that the old faith was crumbling and he wondered what men would live by when it was dead. He saw how the work of Huxley and the rest aided in part in battering down the bulwarks of that Faith in which they had been nurtured and which he felt had been instrumental in the development of the character of these men. He foresaw, he thought, that the new order would not hold the requisite outlook and educational processes that might do the same for the character of the generations that would come after them. In fine, the burden of his apprehensiveness, as partly representative of the cultural outlook of thoughtful men of that day, is that Naturalism tends to negate the ancient religious sanctions which, in his view, functioned in keeping men's energies bent on the realization of a certain type of character that more or less avowedly enters into an Englishman's ideal of a Christian gentleman.

Without prejudice to the issue either for or against that ideal,—and without irrelevant discussion of the whole content of the ideal,—it may be pointed out that within certain limits there will be agreement that the pattern of character here referred to was in some measure realized in the actual behavior and working values of a portion of European society in Mr. Balfour's youth, when the naturalistic viewpoint was just beginning to be aggressively expounded. And now that certain postulates of Naturalism have actually become part and parcel of the working hypothesis of Western culture, and have largely replaced the central pre-naturalistic postulates, it is a matter of interest to check up on Mr. Balfour's prognosis of thirty years ago, and that, if possible, without prejudice either

for or against the implications of the naturalistic viewpoint.

Such checking up can, of necessity, be only partial, standing only as a general estimation of tendencies, with no presumption to clothe itself with finality. The trend may be judged by the reader himself on the basis of his general observation of the world of today. Some specific expressions of opinion and some types of public activity that bear upon the question will be cited here only by way of illustration.

From among the first we may take as an example Professor Pratt's evaluation of the status of the religious life in America today.² In his estimation there is a lull in devotion to the formal processes once current in connection with the religious life. And in his attempt to get at contributory phenomena—it may be misleading to speak of them as 'causes'—there are mentioned, among other items, Pragmatism and Naturalism. In general, Professor Pratt's tone is one of regret and of the nature of an apology (whether justified or not is irrelevant here) to the effect that the older generation has failed to prepare the present one for its contemporary crisis. With the decline, then, of the old Christian postulates and the rise of Naturalism with its postulates has passed at least the outward form of devoutness. And with this there tends to pass also from the contemporary life a certain element of sweetness and light that some attribute to the pre-naturalistic viewpoint.

There is, furthermore, in other quarters no dearth of sentimental arraignment of contemporary life: that with the old devoutness there has passed away the old chivalry. One of our most successful makers of 'best sellers' deplores this passing and projects a sentimental picture

² Pratt, J. B.: "Religion and the Younger Generation," *The Yale Review*, xii, 1923, pp. 594-613.

upon the screen inviting to a return to the manners of an earlier day. This writer has a youth enter upon the ministry, filled with hunger and zeal for righteousness. The young man discovers that Main Street, whether of Illinois or Kansas or some old New England town, cannot be budged, and so he heroically settles his problem by inheriting a silver mine and shaking the dust of the Main Street pulpit off his heels.

In Professor Pratt's gentle apology for his generation and in the novelist's sentimental arraignment, the materialism of the age and its lack of chivalry and vision are charged to the account of the naturalistic point of view. The expressions are cited as being merely symptomatic and are much the same both in content and in tenor as Mr. Balfour's prognosis of thirty years ago. As analyses, however, they may mislead. For, in the first place, those who live with eyes open and hearts receptive know that the fundamental decencies still abide with us in some measure in spite of the ascendancy of Naturalism and the decline of the ideology of the Mosaic and Christian traditions. And in the second place, it would have been just as easy to make out a case for placing the phenomena to the account of a changed economic order. The fact of the matter is that phenomena are complex. It is a mistake to assign to the ideology of Christianity alone the function of being the bulwark of the decencies and to see in Naturalism unambiguously a menace to the moral fiber of our time,—just as it is a mistake to attribute, as is sometimes done, the chivalry of another day solely to the feudal system and the decline of it to the ascendancy of the capitalistic order.

That there is, however, a felt problem here, is clear. Professor Pratt is sad; Bryan's followers are alarmed to the point of militancy; and representatives of science and leaders in instituted religion are actively engaged in at-

tempting a *rapprochement*. A prince of the church considers seriously the advisability of subscribing to the doctrine of evolution; while scientists express the conviction that the enthusiasm that was once released by the hope of Kingdom Come will find an adequate outlet in the espousal of a program for the betterment of the human race by eugenic breeding and by sterilization of the feeble-minded and the criminal.³

The effect upon the people—this being a democratic age—of this drama of *rapprochement* between representatives of science and of religion still waits to be determined. In the meantime we would essay the less dramatic task of making an analysis of the psychological patterns of the scientific and the religious attitudes, and of the physiological processes involved in the technique of the scientific and of the religious life. For it is such analysis that promises to open the way to an understanding of the cultural development that leads ultimately to the naturalistic viewpoint in the enlightened age of culture epochs.

³ *Vide* Mathews, Shailer: *Contributions of Science to Religion*, New York, 1924, pp. 295-298.

II.

THE HISTORIC SETTING OF THE NATURALISTIC VIEWPOINT

IN its larger historic setting, the contemporary triumph of Naturalism constitutes the culmination of the revolt against dogma which received such marked momentum in the periods of the Reformation and of the Enlightenment. What Calvin, Luther, Wyclif, and Hus represent on the side of so-called religious freedom has its counterpart in Bacon, Erasmus, and More, in Descartes, Locke, and Hume on the side of intellectual freedom. The movement was not in essence an opposition between the field of science and the field of belief. It was, at its best, the expressed desire of the mature mind to examine into the ground for faith on the basis of first-hand experience. .

Attention first turned to an examination of the phenomena of the physical order, in Galileo, Giordano Bruno, Kepler, and Copernicus, in Bacon and Newton. Later, in the same spirit of inquiry, it turned to the phenomena of the biological order, in Lamareck, Darwin, Wallace, and Mendel. Of such as these is the spirit of natural science and in whatever field it is truly operative it aims to subject phenomena to a critical examination and it is undismayed always, even though it leads, at some points, necessarily, to disillusionment—the disillusionment of intellectual maturity.

This development in the intellectual and cultural history of our Western society has its parallel in the Roman world of the first three centuries of our era, in the Greek world of the fourth century B.C., and in the Egyptian Empire at its height. If one may judge from the sophisticated tone of some of the fragments of the polite literature of

the Empire on the Nile, there were in Egypt,¹ as there were also in the ancient empires of Eastern Asia, those who call out, like Matthew Arnold of a later day, and counsel that we gather together a few things from the shipwreck of a greater faith to build some sort of spiritual shelter out of the fragments that are left.

We shall not at this point enter upon theoretical considerations as to why it is that the cultural cycles or epochs of human history present the temporal patterning in which the early ages, characterized by a naïve 'faith' in the supernatural, gradually give place, in consequence of processes of political and economic growth, to a crowning age of a critical Naturalism with its disillusion and sometimes its cynicism. It is enough to note here that they who look intently into the unfolding of human history, report that when a cultural epoch arrives at this stage there are certain attendant phenomena constituting a secondary theme and pointing as it were both to the break-up of things and to the commencement of a new cycle arising out of the chaos of the old. In the drama of such historic cycles the phenomena of decline are often foretold by Cassandra-voices like that of the young Mr. Balfour; or else men are urged to prepare for them by such voices as that of Matthew Arnold. Who shall say whether or not such periods of high cultural development necessarily involve, as they have involved in the past, social, political, and economic upheavals and with these a recrudescence of credulity in the 'supernatural'? Who shall see, in the present multiplication of new cults outside the established churches, a sign of gathering storm in which there shall be a decline of science and the whole world be plunged into chaos, as formerly a nation or a continent? Who could affirm that the civilization of our day is already hollow at the core, as was that of Rome,

¹ *Vide* Petrie, W. M. F.: *A History of Egypt*, London, 1894-1905.

standing as a shell whose emptiness became manifest only when the Goths touched the edifice, or as that in the parallel cases of the ancient empires of Asia and the Nile, which continued to stand for a long time by reason of the inertia of things, after the spirit of life had fled? Our chief interest here, however, concerns not the rise and fall of empires but the status of the naturalistic viewpoint in such a changing world.

Whatever the specific inducing factors may be, it is true that since the late war there has been among the people a recrudescence of belief in the supernatural,—and more particularly at the very point where natural science has prided itself on rendering most immediate service. Certain princes of a church that has hitherto staunchly withstood all incursions of Naturalism upon its central doctrine of the supernatural mystery of its Eucharist, have momentarily forgotten, it seems, its healing shrines which have flourished to this day and they have now allied themselves with the healers of the naturalistic school in what they have jointly described as an effort to resist the growth of cults and societies which, they believe, are dangerous to the progress of scientific medicine. A great light in another church avowing allegiance to the same central doctrine announces that acceptance of the naturalistic doctrine of evolution may be not incompatible, perhaps, with its central dogmas. Both are instances of a change of front on the part of those forms of instituted religion whose chief distinction has been that they have resolutely stood by the hypothesis of the older Christian tradition and have allowed no ambiguity to attach to the non-naturalistic character of the central postulates of that tradition.

If we look upon both these items in historical perspective, we have the curious situation in which that part of instituted Christianity which has continued longest to

avow allegiance to certain supernatural doctrines, is combining with the forces of naturalistic medicine to combat the spread of reputedly unscientific methods of healing. And, on the other hand, we find over against this combination, not only the militant successors of Mr. Bryan, who feel that the doctrine of evolution is inimical to the decencies, but all that medley of cheerful faith-healers and all the restless exponents of experimentalism recruited from among those who have not found healing either in mind or in body at the hands of orthodox medicine or orthodox religion. Here, then, is one of the ironies of history: that the last bulwarks of supernaturalistic Christian dogma and the most aggressive exponent of Naturalism, namely, modern medicine, should stand shoulder to shoulder to oppose these new heresies which they deem to be dangerous because they savor of magic and supernaturalism.

Whether or not the contemporary impetus to supernaturalism parallels that which was to be observed in the declining Roman civilization, in which the best minds and characters fared hardly on the naturalistic philosophy of a Lucretius, while the oppressed and spiritually famished masses were turning to the supernaturalism of Mithraism and of Christianity with their promise of a way of escape into a spiritual order, remains for the future to decide.

We need raise no alarm and cry out that history is repeating itself. We do not know that it will, nor that it must. In the biological realm the characters of species continually reappear in successive life-cycles. To this there is a parallel in the epochs or cycles of human culture. In the successive civilizations of history,² each tends to repeat, in its cycle, certain general characters such as the sequence of prevailing attitudes, beginning in a certain naïve 'faith' in the supernatural, passing then through a period of gradual enlightenment, until a period

² *Vide* Petrie, W. M. F.: *The Revolutions of Civilizations*, London, 1911.

of sophistication, with the characteristic slant of the naturalistic point of view, supervenes,—and this usually when the civilization is at its height; then arise certain concomitant phenomena typical of 'decline,' and alongside them, sometimes in the purlieus of the pariah, sometimes in the drawing rooms of the elect, there is noticeable a tendency to seek for healing, bodily or mental, in the discarded supernatural formulæ which stand in curious contrast to the dominant naturalistic hypothesis.⁸ At this stage a civilization may stand for a long time—only one day to crumble at the impact of some factor brought to bear upon it from without. Such has been the course of the culture epochs or cycles within human history,—the pattern repeating itself as does the typical pattern of the biological species from generation to generation.

Here we venture the hypothesis of a further possible parallel between the biological succession and human culture epochs. As in the biological realm there arise sometimes variations in species under the influence of ecological crises or changes in environmental conditions, so, possibly, in the crisis-situations of human civilizations, there may occur the factors that might release a new humanity whose character might deviate in some significant respect from the configuration of attributes that has found repeated expression in the typical pattern of culture epochs which we have just indicated. And should the crisis-situation produce such a variant from the characteristic attitudes, the variation would be expressed in a historic cycle or epoch that would differ in pattern from the typical one which history has repeatedly given us.

In the light of this hypothesis of culture epochs, we may note that the naturalistic viewpoint has been characteris-

⁸ *Vide An Ambassador's Memoirs*, by Maurice Paléologue (New York, 1925), for an account of the influence of the monk, Gregor Novikh, called Rasputin, at the court of the late czar of Russia.

tic always of cultural maturity,—that it represents negatively a certain disillusionment, and may serve to disenamor the individual with reference to quixotic ventures, but represents positively also an achievement in intellectual and moral freedom. It was once thought that in the possession of this freedom, for which in our own epoch Wyclif and Hus, Bruno and Bacon, and Darwin and Huxley have contended each in his own way, there resides the possibility of guiding our contemporary Western civilization, and of steering it upon a course that might make our epoch *different* from its predecessors. In the latter, events took their course because conditions could not be controlled as they might be in an age of science; but in our age, our economic, yes, even our physiological, destiny was thought to be under control. Hence there was indicated the possibility of a different course for our own culture epoch, on the parallel with the possibility of the rise of new species in the succession of biologic cycles.

Yet the signs of the times do not as yet indicate that our epoch is realizing on this expectation,—but that the tendencies so far are rather in the usual direction that other culture epochs have taken before it. Our Naturalism has not yet succeeded in giving to our age that freedom of spirit, or that largeness of vision, or that exquisite precision of method that are the essential marks of naturalistic science. Western civilization appears often to be floundering; bereft of the steadying influence of the ancient faith supported by dogma, bereft also, perhaps, of the ancient common sense, and imbued hardly at all, as yet, with the spirit of quest that is the mark of science, it seeks vaguely, and finds, a new dogma in Naturalism,—without perceiving that the saving power of Naturalism lies not in its hypotheses but in its freedom.

Apparently man at once desires and fears this freedom. And if dimly he perceives that he fears it because it places

upon him an inner responsibility with regard to its use, it is not difficult to understand that he should take steps from time to time that may prevent him from achieving that freedom too easily. As there are those who are at a loss what to do with a day entirely free of duties, so there are those who dread the thought of the removal of the restraints—political, economic, social, traditional—that keep their lives, by outward constraint, running in the accepted grooves. And hence the apprehension of those who, like Mr. Balfour, anticipate what seems to them moral collapse when the ancient bulwarks of accepted standards are being undermined by Naturalism. Hence also the contemporary disturbance of some of the leaders of science and of instituted religion. It is but an indication that Mr. Balfour's anticipation of thirty years ago was correct. And if, furthermore, such apprehension results, in a naturalistic age, in the precipitation of programs of reform that aim principally to check the wonted course of civilizations by attempting to quell symptoms of 'decline' through the institution of restrictive measures, it would indicate that to that extent the age is not realizing upon the possibility of a development, potential to the naturalistic attitude, that might make the epoch of Western culture stand out as a unique variant among the historic cycles of civilization.

And so, while, on the one hand, the historian's observation concerning the cyclic patterning of culture epochs in the stages of rise, growth, and decay of civilization comes to take on, in general, a more vital significance by reason of the corroborative evidence from the fields of psychology and biology, and strengthens, more specifically, and for the same reason, certain patent implications concerning our contemporary Western civilization,—it becomes manifest also that the biological envisagement of human history, while thus corroborating these implications,

makes, furthermore, a unique contribution to humanity's present outlook, in that it points not only to the biological and psychological ground for the cyclic succession of the dominant attitudes and behavior-tendencies characterizing the different ages of the typical culture epoch of history, but points also to the elements that might represent a variation from the typical attitudes and behavior-tendencies at the stage of 'decline.' One such element is the attitude of open search that is of the very flower of the naturalistic viewpoint. Never yet in history has a civilization appeared in which this has been allowed to come to full fruition in complete intellectual freedom, in eager questing, and, above all, in a certain capacity for detachment that is the mark of spiritual as well as of scientific majority. For it is this attitude of detachment—in itself interesting as it is rare—that, viewed objectively, as a biological phenomenon, presents distinctly a variation in behavior-tendency which might be involved in the realization of a new pattern of human culture—a culture that might go another way than have its predecessors in history.

If, however, our contemporary Naturalism forgets its commitment to foster in the individual of our age this spirit of inquiry and search in all directions, and attempts rather to substitute a new dogmatism for the old and thereby deny the source from which it sprang,—*viz.*, the desire for intellectual and moral freedom,—then will Naturalism have failed indeed also in our epoch to develop in a direction that would have made this epoch different. And another civilization may then be recorded in history as having 'gone down' after the same manner as its predecessors.

III.

NATURALISM: ATTITUDE, HYPOTHESIS, OR METHOD?

IN the many contemporary discussions in which Naturalism is brought upon the *tapis* in its relation to a felt crisis in our civilization, a certain vagueness of content attaches often to the meaning of the term, and its implications seem not always clear even to those who feel called upon to speak in public. Naturalism is sometimes spoken of as a point of view. At times it is used synonymously with such things as pragmatism, materialism, and natural science. Again it is taken to designate a set of postulates concerning the nature of the universe and is contrasted with certain postulates of the historic Church or of newer cults that imply hypotheses avowedly at variance with those implied in Naturalism. And sometimes it is not so much these metaphysical implications that are stressed in such discussion, but rather the implications for behavior and conduct. President Jordan¹ spoke recently of "material science" as opposed to a dangerous recrudescence of supernaturalism. Apart from this apparent commitment of modern science to a 'materialistic' hypothesis, the statement implies a critical social situation—chaos, disorganization—which some of the leaders of our Western world profess to sense and in which the naturalistic attitude and natural science are thought to be involved. In such discussions of the crisis there is sometimes not lacking an undercurrent of feeling—as in this pronouncement by President Jordan, who sees a menace in a contemporary renaissance of certain types of primitive belief, and again as in Lord Balfour's² recent recom-

¹ Jordan, D. S.: "Science and Sciosophy," *Science*, lix, June 27, 1924, pp. 563-569.

² Balfour, A. J.: *Theism and Thought*, New York, 1924.

mendation of a return to theism. That there is some sort of conflict here is evident—and this conflict might be variously envisaged as a matter of difference in attitudes, or one of difference in postulated assumptions, or finally it may be a matter of differences in methods of procedure.

What emerges most clearly is that there is often operative in these discussions of a contemporary crisis—despite other things, such as considerations of social control or of diplomacy—a fundamental difference in the possible attitudes toward life. At its best this general difference in attitude might be stated as that between those who primarily look upon life as *something to be understood*, and those who regard it as *something to be entered upon and experienced*. It is the difference between those who wonder about life, and those who ‘live’ it. Again, it is the difference between the questioning, reflective attitude and the practical attitude that looks to results in action.

Secondly, there becomes apparent a difference in working hypotheses concerning the nature of the universe and man’s relation to it,—the difference in the metaphysical postulate implied, for example, in the doctrine of the historic Church concerning the Eucharist, on the one hand, and that implied in the conception of ‘material science’ as used by President Jordan.

And finally there is found involved a third difference, a difference of method, that is, in the manner of using ideas or hypotheses. Thus one may assign to an hypothesis primarily an explanatory function, or one may use it chiefly for purposes of control.

To clinch these differences in attitude, in hypothesis, and in procedure, we may call to mind the point that was made by the writers of the Pragmatist tendency of about twenty years ago. One of the outstanding things about the movement appears to have been its emphasis on the function of ‘ideas’ in determining results in action. This is

touched upon repeatedly by William James.³ If we judge James correctly, he would bring a measure of understanding to the college professor who tells us in the *Atlantic Monthly* how he had suddenly hit upon a technique of prayer that brought results.⁴ He writes: "I do not know why God should have blessed me for the past two years with an almost continuous stream of answered prayer. Some of the answers were marvelous, many unexplainable, all of them joy-giving. . . . My method was so simple, so natural, it seemed to me that its very simplicity defied analysis. . . ." Expounding this method, he continues: "What are the underlying principles in Walter Camp's daily dozen? The first principle is that the man shall stretch his muscles, as the caged lion stretches whenever he can. And, mark you, the muscles that are seen are not so important as the muscles that are unseen—in the language of Walter Camp, 'the muscles under the ribs.' This should be the first principle of prayer also . . . to make the 'stretching' of the mind to see God a continuous habit all through the day, to make the deep breathing of the soul which mentally denies entrance of the bad thought to the brain and expands the good thought,—a steady automatic habit of the subconsciousness. . . . Before it is possible to breathe, one must be surrounded by atmosphere and atmosphere must be *in one*. Likewise, before it is possible to commune with God, which is a more conventional way of characterizing the deep breathing of the soul, one must know that God surrounds all and God is in all; that the Kingdom of Heaven is *here* and *now*. . . . Marvelous results will come if one will turn in thought to God and Heaven, denying the existence in Heaven of the wrong thing felt or thought, and then real-

³ James, William: *The Will to Believe*, New York, 1897.

⁴ Clark, Glenn: "The Soul's Sincere Desire," *Atlantic Monthly*, cxxxiv, 1924, pp. 167 ff.

ize that in God and Heaven the opposite condition prevails. . . . For money troubles, realize: There is no want in Heaven and turn in thought to 1, 2, and 7 in exercise I. . . .”

It is clear that in this exercise the ancient and dignified conceptual heritage of Judaism and Christianity is made not only to release attitudes of expectation, courage, and hope, but also to so key the organism that certain outward results are achieved. It is this pragmatic use of such ideology for the achievement of results that the American students of the psychology of religion have stressed,—and that with scientific legitimacy, for the most part, and without prejudice for or against the metaphysical hypothesis concerning the existence of the Divine Personality implied in the exercise.

Over against this uncritical use of ideas shot through with far-reaching hypothetical implications, we have the critical scientific procedure which carefully questions the validity of just such implications and the grounds on which they are postulated. This latter procedure is illustrated in another article on prayer appearing in the same issue of the *Atlantic Monthly*.⁵ In it there is a questioning of the very implications that are so cheerfully assumed by the writer just quoted. Our second writer, more naturalistically inclined, notes that he must allow pragmatic efficacy to Catholicism, but at the same time he sees danger ahead for it because “it will fail to satisfy the intellect, which will reject the Church’s interpretation of the Mass.” In other words, the ‘intellect’ must repudiate, he thinks, the hypothesis of real communion,—a hypothesis accepted in essence quite unhesitatingly by the other writer. Furthermore, our naturalistically inclined writer feels that we must wait until science has spoken. “The problem,” he says, “is this: granted that there is a con-

⁵ Lake, Kirsopp: “Prayer,” *Atlantic Monthly*, cxxxiv, 1924, pp. 163 ff.

sciousness of communion, which appears to be with some external power, is that appearance correct, or is the communion really with some part of the man's own nature which is ordinarily submerged? Only the professional psychologist is really competent to discuss this question properly, but anyone can see that it is not an idle one, and that any answer gives rise to others."

The two writers cited serve well to illustrate the differences at the three points mentioned, *viz.*, in respect to attitude, to hypothesis, and to procedure.

The difference in attitude, it seems, cuts deep. It is, in an intimate way, bound up with the selection of the working hypothesis itself and with the type of procedure represented in the individual. The first writer proceeds at once to commune with God and to live in heaven, while the second raises the question whether such communion is real or merely an appearance. The first writer says: "Let me stand in the market place with the physical culturists and demand, as they demand, fifteen minutes of your time every day for two months. And while I hesitate to promise, as they promise, that at the end of that time you will find yourself a new man, this I can say: at the end of that time you will find yourself in a new world. You will find yourself in a friendly universe where religion will no longer be a thing to be believed or disbelieved, a thing to be worn or cast off, but where religion will be a part of life as blood is a part of the body." Clearly, life here is primarily a thing to be lived, while for our second writer, on the other hand, life is rather a thing that presents curious anomalies that invite to reflection. The attitude has a distinctly intellectual cast, the attitude in which action is held in abeyance until the intellect is satisfied.

As to the difference in hypothesis, that is already apparent. The logical content of the first writer's world-view is manifest: it implies the 'reality' of all that the

second writer questions and it implies more. While the second writer affirms that the intellect "will reject the Church's interpretation of the Mass," the first one, though apparently not a Catholic, proceeds practically on the interpretation that every act is in fact a Eucharist. While the second holds in abeyance the decision on the reality of the communion, the first one affirms that reality. For the second one "God is the unborn life of the world that is yet to be,"—something future, and, one suspects, something remote. For the first, on the other hand, the Deity is present and close at hand, like the atmosphere, or again, He is the Shepherd of the twenty-third Psalm. A most significant difference, however, is that while the second writer constantly allows relevant considerations of natural science to enter in,—those of meteorology, of the medical experts, and of psychology,—having a fine regard in his hypotheses for the limits set by scientific thought, the first writer disregards*all such and operates with the ancient Judaic and Christian ideologies, amplifying and adapting them in truly pragmatic fashion, without subjecting them to criticism for purposes of rationalization.

And, finally, as to procedure, the difference is outstanding. The second writer proceeds after the naturalist's manner to examine into the nature of the phenomena of prayer—to distinguish between assumption and fact—and more particularly decides to wait upon the specialist's opinion on important points in the development of hypotheses. Our first writer, on the other hand, proceeds in simple, straightforward manner to use his ideology for getting results. He takes the imagery of the twenty-third Psalm, and by focusing attention upon the items: 'The Lord is my Shepherd,' 'I shall not want,' 'I will fear no evil,' and 'Surely goodness and mercy shall follow me all the days of my life and I will dwell in the house of the

Lord forever,' he keys himself—his organic processes and his nervous system—to function in specific ways so that they operate in a manner concerning which he has no doubts.

The analysis is helpful for distinguishing certain aspects of the cultural situation in our contemporary world.

Attitude, professed world-view, and mode of procedure are not always in agreement in human personalities. One may give good-natured assent to the judgment that it is not exactly 'nice' to take the lives of unoffending creatures like lambs and chickens and calves; yet one will continue placidly to consume a lamb chop on Tuesdays, a veal steak on Thursdays, and roast chicken at Sunday dinner, and while doing so one may indeed see no valid ground for the judgment that one is not actuated generally by a fairly decent measure of humaneness. The situation is similar with respect to some of the mooted issues of our day. When President Jordan becomes alarmed over the recrudescence of primitive beliefs, he is concerned not so much lest certain supernaturalistic hypotheses might replace those of Naturalism, but rather lest certain types of attitude and procedure different from those which have been associated with a naturalistic science, should gain ground in our contemporary world. It is similar considerations that come to the fore in Lord Balfour's recent recommendation of theism. But while there might indeed be possible—as indicated by President Jordan—a decline both of the open-minded attitude and of the experimental tendency under a new leadership that is putting forth, with pontifical authority, curious supernaturalistic doctrines of the pre-scientific stage, we recall that Sir Michael Foster, a quarter-century ago, noted a similar decline attending upon the widespread acceptance of Naturalism in that day. He pointed out that there were not a few who moved within the sphere of its ideology,

who yet partook not at all of the spirit of eager quest or of the attitudes of hopeful anticipation and of open-mindedness which are, historically, the source of Naturalism. He knew that the ardor and enthusiasm of the scientist is, physiologically, attendant upon the circumstance of creative labor and the possibility of the thrills of intellectual adventure and discovery. He knew, too, that the desire for the quest is individual to few and that opportunity for complete dedication to it not open to many, and that the conceptions of science, outside such a setting which makes possible an adequate expression for the life of feeling and will, come to partake, in the life of the layman, of a character different from that which they have in the life of the scientist. This is something not always understood even by the scientist himself, who is given sometimes, it seems, to the fallacy of ascribing to the scientific conceptions and hypotheses the power of releasing enthusiasms and thrills that are, as a matter of fact, the affective reactions belonging to the activities of search and discovery. Hence it is that contemporary programs for imbuing the masses with the naturalistic ideology may be just as futile, so far as releasing such attitudes of mind and such conduct is concerned, as would be the return to philosophic theism in the present crisis in Western civilization. For just as the intellectual acceptance of the theistic hypothesis upon such recommendation does not insure the type of organic and muscular action that was released by the ancient Judaic and Christian ideology in our cheerful discoverer of a new world,—so also a familiar commerce in the formulæ of Naturalism in our contemporary world would not signify that there has been transmitted to the age the secret of the quiet enthusiasm sometimes released and sustained in the scientific quest.

IV.

WORLD-VIEW, EMOTIVE TUNING, AND THE RELEASE OF ENERGY

THE decades of Darwin and Huxley, of Tyndall and Spencer, were stirring ones in the intellectual life of the nineteenth century. But while the exhilaration and the sense of freedom that came with the new biological envisagement of the life of man quickened the expectation that presently, perhaps very presently even, new objectives might appear that would captivate the wills and give direction to the energies of men on a warrant seemingly more stable than those given by creeds and philosophies,—there was also, as we saw, not lacking a note of apprehension lest the new Naturalism might weaken the bulwarks of character as expressed in conduct.

This apprehension, it seems, motivated not only reactionary expressions like that of the famous bishop who is reported to have said he didn't expect much from those who believed themselves descended from monkeys, but also such dignified emphasis upon dogma as the clear-cut classical statement of Cardinal Newman.¹ This apprehension may be sensed in the literature of Ruskin and Matthew Arnold and recurs in veiled form in some of the utterances of the scientific leaders themselves. No one was more actively convinced than was Thomas Huxley that in the new age of science its truth would invest human living not only with freedom but also with dignity; yet even he is at pains to distinguish between "the materialistic formulæ and symbols" that science uses and systematic materialism, whose "errors" he fears "may paralyze the

¹ Newman, J. H.: *Apologia pro Vita Sua*, London, 1864.

energies and destroy the beauty of a life.”² And Sir Michael Foster, writing in the closing year of the last century, remarks similarly upon a possible dispiritedness rightly or wrongly attributed to the naturalistic outlook. He says: “In the latter-day writings of some who know not science much may be read which shows that the writer is losing, or has lost, hope in the future of mankind. There are not a few of these; their repeated utterances make a sign of the times.”³ Of such utterances, that of Arnold, embodied in his poem, “Dover Beach,” may be cited, perhaps, as a classic example:

. . . the world . . .
 Hath really neither joy, nor love, nor light,
 Nor certitude, nor peace, nor help for pain;
 And we are here as on a darkling plain
 Swept with confused alarms of struggle and flight,
 Where ignorant armies clash by night.

As it was then so it is now. Balfour,⁴ entering upon old age, and apparently continuing, now as in his youth when he wrote his *Foundations of Belief*, under the notion that Naturalism functions in producing this *malaise* of the will, proceeds to demolish the naturalistic hypothesis by showing that Huxley's postulate of intellect as epiphenomenon would invalidate the postulate itself, since it too is a product of that intellect. A reviewer⁵ who says that we already know that Balfour is “on the side of the angels,” thinks the earl's argument decidedly clever. Clever or mere word-mongering, perhaps, it does little to bring about the ascendancy of the attitude of constructive faith

² Huxley, T. H.: “On the Physical Basis of Life,” in *Half Hours with Modern Scientists*, New Haven, 1871, p. 35.

³ President's Address, Dover Meeting of B.A.A.S., 1899.

⁴ Balfour, A. J.: *Theism and Thought*, New York, 1924.

⁵ *Vide The International Journal of Ethics*, xxxv, 1924, pp. 98-99.

that some feel is lacking in this our Western world in which the naturalistic is the dominant point of view.

The essential point to be made here, however, is that the supposed effect of the dominant naturalistic hypothesis upon the public mind presents a problem which need not be left in the realm of metaphysics, but can be stated in terms of physiology, biology, and psychology, with some promise of successful definition and perhaps also of partial solution.

In appraising such expressions of apprehension concerning the alleged effect of the dominance of the naturalistic hypothesis in the modern world, it is well to distinguish between the manner in which physiological energy is released and the direction in which effort is expended. The question whether or not the amount of expended energy is actually affected by the changed world-view requires no categorical answer either way. What is of interest to us here in this analysis is the physiological mechanism that would control such an increase or decrease of energy-output on the part of the human organism.

The implications of statements such as those of Thomas Huxley and Michael Foster point already in the direction of the two major ones of these physiological mechanisms, namely, the mechanism of emotive tuning of the organism as in hope and in the æsthetic reaction and the mechanism of neural inhibition involved in the 'paralysis' of which Huxley speaks.

It was William James who remarked the fact of apparent levels of energy,⁶—and the psychology and physiology of the last decade have given us a fairly clear conception of the basic part played by emotive tuning as a factor in determining the energy-output. In certain types of emotive states, such as hope and enthusiasm, the mus-

⁶ James, William: *On Vital Reserves*, New York, 1911.

cles are supplied directly with a greater amount of energy. Like Saint Paul, some eighteen centuries earlier, Foster had occasion to note that hope and faith are effective for maintaining a steady flow of energy at a relatively high level. Saint Paul was a regular wizard, almost as much so as Mr. Thomas Edison is reported to be, in the matter of keying himself for long and arduous labor. Indeed, this state appears in the case of both of these men to have become a physiological habitus of the organism.

It should be noted that another group of emotive states, the depressor group, differs markedly from these. Instead of raising the energy-output, as do hope and enthusiasm, they function specifically in lowering it, as in *ennui*, 'peplessness,' and despair. Anyone who has ever been 'completely floored' by a piece of bad news, knows how all the energy seems suddenly to flow out of one; the feet are too heavy to be lifted from the ground, and the muscles of the face are felt suddenly to become as so much dead weight.

Both groups of emotive states are primarily conditioned by bodily factors, that is, they depend upon the release of different chemisms in the body.

Such are the facts concerning one of the physiological bases for the increase or decrease of energy-output. The question then arises whether there is any ground for the apprehension, felt even by a man like Huxley, that such physiological processes are in some way determined directly by the world-view current in society. Psychology, physiology, and biology point at least in part to an answer.

The emotive state, whatever its variety, is a function of organic responses, each involving different and specifically determined chemical processes. And just as reactions of the skeletal or outer muscles of the body may be elicited reflexly by the operation of certain 'original'—or as the behaviorists call them, 'unconditioned'—forms of

stimulus, so, similarly, these internal physiological processes may be called into play by specific peripheral stimulations. Watson, following Pavlov, proposes to discover the specific form of stimulus that originally, *i.e.*, without training, calls into play these physiological reactions. A simple illustration is the case of the salivary reflex in the dog.⁷ Stimulation of the sense-organs in the mouth results in increased salivary flow. If, however, the skin of the foreleg or of any other portion of the body be at the same time treated with a local application of ice, then after a sufficient number of repetitions, when presently the ice is applied alone, the salivary reaction will arise in response to this new form of stimulation. Instead of the characteristic original, unconditioned, *i.e.*, untutored, shiver that was at first elicited by cold stimulation, we have this other, conditioned, salivary reflex whose original or 'natural' stimulus is the contact of food in the mouth.

Now it is after just this manner that all human behavior becomes organized in a continuous process of complication of stimuli and responses. On the side of stimulus, the taste of food in the mouth, the smell of it, the sight of it, the sounds of words and the visual symbols applied to it—all these become organized into a complex under the influence of education, till by the time the new-born child grows to manhood or womanhood, the verbal description of a strawberry shortcake—a large golden yellow island surrounded by a red sea of crushed berries, and the whole capped by a white mountain of whipped cream—these printed symbols, in fact, function as stimulus in releasing an increased flow of saliva in the mouth of the gentle reader. Or, if one prefers, the 'idea' of the shortcake, releases the response that was 'originally' released only by the actual contact of food in the mouth. After this

⁷ *Vide* Watson, J. B.: *Psychology from the Standpoint of a Behaviorist*, Philadelphia, 1924, pp. 29-30.

very manner our 'worlds' are built up through the establishment of just such connections between various stimuli. And on the side of action—both of the internal visceral organs and of the external muscles—there is a similar elaboration. The action of salivary flow is accompanied by a heightening of the secretions of the rest of the alimentary tract, and this action in turn is accompanied by a heightened tendency of the blood to flow to the viscera—all of which constitutes a complex organic reaction favoring efficient digestion. In the case of the internal processes, these interrelations are already prepared for by nature, but the pattern may be modified within limits,^s as when some incident changes our habituated organic reaction to food or when as gourmands we acquire a taste for the flesh of game that has hung until it is 'high.'

It is in this way that the entire *repertoire* of physiological processes that underlie not only our emotional life, our likes and dislikes, but also our subtlest sentiments and evaluations, becomes organized into what it is. And so, just as the image of the delicious strawberry shortcake here operates specifically in fostering good digestion, the attitude of expecting an imminent economic shortage may tune the organism, by inducing anxiety or dread, in a way that will definitely interfere with the digestive processes instead of fostering them. And if certain world-views or certain metaphysical formulæ come to have attached to them, in the process of their presentation, one group rather than another of these bodily reactions, these latter would operate each according to its own individual mode in building up, in mobilizing, or in depleting through autotoxic action, the energies of man.

These processes are different in what are called hope, anxiety, doubt, and disgust, for instance. The physiologi-

^s Yerkes, R. M., and Morgulis, S.: "The Method of Pavlov in Animal Psychology," *Psychological Bulletin*, vi, 1919, pp. 257-273.

cal result, however, is not to be attributed to some magical power residing in the logical postulates involved in a world-view such as Theism or Naturalism, but to the organic processes that are released. It remains then no mystery that under certain physiological conditions the image of a bountiful table presently to be spread before us, or of a cup running over, or of a universe full of accessible goods, or of the strawberry shortcake mentioned above, should be accompanied by affective processes closely kin on the physiological side to those of the ancient Christian hope, which functions so effectively in raising the level of available energy, as is indicated anew by the writer whom we mentioned in an earlier chapter; while on the other hand images of imminent economic want, or of a cold, unanswering, impersonal universe, should be accompanied by the organic reverberations characteristic of the depressor states, in which energy is at low ebb.

Here then is the physiological ground for such difference in affective coloring and energy-output in the states of hope and of depression, for instance, that might become attached as physiological reactions to the ideas of a theistically and of a mechanistically controlled universe. When the emotional tuning is thus different, the energy-output will vary accordingly. On the side of physiological mechanisms the problem presents no difficulty if the naturalistic hypothesis, as it is entertained in our twentieth-century civilization, tends to be accompanied by a lessening of hopefulness, buoyancy, and enthusiasm as was remarked by Sir Michael Foster. If it be, indeed, true that our contemporary naturalistic viewpoint has this organic setting, it means simply that our contemporary world tends to bring to the fore implications that are carried in terms of imagery which has become attached on the bodily side to attitudes of apprehensiveness, fear, and distrust. But these attitudes, if they be present, are not attached

to the hypothesis in so necessary a manner as would appear to be assumed by some of those who would commend a change from the naturalistic to a theistic hypothesis. It is to be noted that the changed industrial process of our day, as representing an element in man's environment, is attended by a greater economic precariousness for the individual and by a loosening of those personal bonds that in an older, more stable, society give value to lives within the economic relationships themselves. Such a change in economic and social processes affects the organic and muscular reactions in specific ways. For it is this change in the economic order that presents the environmental conditions favoring the selection and establishment of the organic habits of our contemporary Western world so that there appears that slump in enthusiasm that some have remarked.

No matter how plausible a case may be made out for the increased 'coöperativeness,' 'interdependence,' and 'social solidarity' of our modern world as Patten⁹ has recently attempted to do,—such philosophizing avails nothing to make the masses more buoyant in spirit or more hopeful in outlook, so long as the economic process fosters the organic habits of uncertainty and dread in the individual, whose life can achieve neither purpose nor unity by reason of the ever-imminent possibility of the 'yellow envelope' that cuts him off from the job in which he has invested himself. With the conditions removed which, in the old order, made for stability, there is, first of all, in the individual a weakening of the sense of unity with the social group. This weakening results in the establishment and fostering of the attitude of indifference. There is, secondly, a lessening of reasonable expectation on the part of the individual that he is building, in his daily work, something permanently his own. This second item in the

⁹ Patten, William: *The Grand Strategy of Evolution*, Boston, 1920.

economic process results at its best in the attitude of the gypsy—moral, social, economic—and at its worst it makes dread of economic want a permanent physiological habitus of the individual.

The current conception of a 'cold mechanistic universe,' as it is tacitly accepted as world-view by the man of the people, is but an intellectual clincher of this state of affairs existing in the economic and social order. Not the naturalistic hypothesis, but these economic and social conditions of our day, with the fact of conflict and struggle for survival ever present, constitute the immediate stimuli for this organic slump and for the lowering in enthusiasm that some profess to note in our contemporary world. There is, indeed, no necessary connection between the naturalistic hypothesis and a slowing down of energy-output, any more than there is between the application of the ice to the foreleg of the dog and the release of the salivary reaction:—it is only because the naturalistic hypothesis has become associated with the existing social and economic order which fosters these reactions, that the hypothesis, too, may have come, in many individuals, to have attached to it, as conditioned reflexes, these organic reactions.

V.

THE PHYSIOLOGIC BASIS OF THE SCIENTIFIC QUEST

THAT the process of knowing, of attaining knowledge, is founded somehow in the biologic order,¹ we do not doubt; and that knowing plays an important part in the biologic process as represented in the life of man is also clear; nevertheless, the relation of 'knowledge' to the biologic process continues to be one of the most elusive of problems.

In many variations, and in many settings, the problem reappears. The allusion in Genesis to the tree of knowledge may appear, to some, to reveal, under cover of its poetic form, keen insight into the problem. It clearly implies that somehow the attainment of 'knowledge' on the part of man makes a difference in his status in the biological order. Again, the problem is touched upon in the philosophic systems of the Greeks; and a large part of their speculations concerns the epistemological problem about the nature of knowledge, and they developed elaborate theories as to how mind may receive 'knowledge' of the external world in the process of perception. Similarly, it is this same epistemological problem that again engages the philosophers at the beginning of the modern period, as in the essays of Descartes, Locke, and Hume.

And to this day we find it difficult to state the problem adequately, yet we continue to feel its importance. Its significance comes home to man especially when there is precipitated in consciousness some fact or some truth that momentarily fills him with dread. His impulse may be to attempt to 'shut out of mind' the fact or truth,

¹ *Vide* Angell, J. R.: *Psychology*, 4th edition, revised, New York, 1908, pp. 7-8.

rather than to deal with it directly. Man does not desire to 'know' everything; nor is he keyed for the quest after knowledge at all times. Mr. Bertrand Russell² grows almost rhapsodical on this point when he tells us why mankind fears the power of thought—why it shuns the 'truth' that knowledge reveals.

Attempts to state the relation of knowledge—it would be better to speak of the activity of knowing—to the life-process must take into account the following two facts: first, that there are anatomical organs and physiological mechanisms and behavior-tendencies that operate at times in such a way that the human organism senses, observes, and perceives objects, and sometimes 'has ideas' concerning them, and secondly, that there are apparently other behavior-tendencies operative which may result in an inhibition of the function of 'knowing' or may lead to reactions as of withdrawal from the item that has been made known. It is the first of these that we would examine here,—sketching the natural history of the behavior that results in the attainment of knowledge and describing briefly the physiological mechanisms of the scientific quest in their remote beginnings in the lower phyla. But all the while we must bear in mind the second point made above, *viz.*, that man is not primarily a creature that desires and strives after knowledge; that, at times, this creature, to whom the naturalists have given the species-name *Homo sapiens*, definitely rejects knowledge, closes itself against it; that, while the systematic quest after knowledge is physiologically prepared for, it is true also that there are complicated mechanisms, some of which can be specifically indicated, that function in inhibiting the process of 'knowing.' For, if the individual may at times feel, as the poet puts it, an inward urge to go in search of knowledge, and exclaim Ulysses-like, 'My pur-

² Russell, Bertrand: *Why Men Fight*, New York, 1917, pp. 178-179.

pose holds to sail beyond the stars and all the Western seas, until I die,"³ he may also discover within the depths of him the apprehension and dread that inhibit the quest and may lead him to shut himself off from knowledge,—and if he is sufficiently versed in psychological observation, he may discover the interesting mechanism by which the psychophysiological organism distorts the judgment of fact under the operation of this determining tendency.

In taking up the analysis of the mechanisms that serve the function of knowledge-getting in its humble biological beginnings, let us review briefly some of the relevant points of the functional psychology of two decades ago. That psychology was in large measure a philosophy of mind, of mind interpreted in the light of the new biology. Mind was there often regarded as a tool or means of biological adjustment. 'Consciousness' was said to arise when the hereditary reflex mechanisms or the habituated modes of response were inadequate, or when they were held up, or when they interfered with one another. The situation was then precipitated into consciousness; and here, at the focus of attention, there was effected a reorganization of behavior-tendencies. This reorganization was reflected or indicated in the pattern of the perception or of the idea. The implication was that the conflict of impulses favored the rise of perception and thought in the process of biological 'adjustment.'

Quite apart from the question of the adequacy or completeness of such a statement of the place of consciousness and mind in the biologic process, it did help to make

³ Compare:

"To follow knowledge like a sinking star
Beyond the utmost bound of human thought
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my purpose holds
To sail beyond the sunset, and the paths
Of all the Western stars, until I die."

—*Alfred Tennyson.*

definite certain specific problems concerning the relation of mental processes to bodily activities,—problems that are crucial for an understanding of man's life in the midst of the order of nature. These are problems concerning *attention* on the one hand and *neural inhibition* on the other. And while these problems have now been side-tracked, the interest in them has been not without results. What are the biological and physiological conditions for the rise of the mental processes, the sensations and images, in terms of which it was once supposed that knowledge was given? In the attack upon the problem of attention, there was developed, on the side of mind, the conception of *clearness* as the essential attribute of mental processes with respect to the attentive state. And on the bodily side attention was seen to involve specific adjustments of the sense-organ and of the body as a whole,—reactions which distinctly favor the clearness of the mental processes.

In terms of behavior, attention may then be regarded as bodily reaction during which other actions (excepting the so-called automatic ones like digestion and breathing) are held up. And when the psychophysical organism thus 'attends,' the impressions received through some sense-organ attain their maximal degree of clearness. The cat watching at the mouse-hole and the dog guarding the door are typical pictures of the bodily attitude in sensory attention.

The condition for clear perception regarded as the fundamental cognitive function is thus a form of bodily behavior which, for the time being, inhibits other reaction-tendencies, or, in physiological terms, raises their 'threshold.' It is when the usual responses to a stimulus are thus held up that the organism is prepared to acquire 'knowledge' of the object.

This attention-reaction takes on many forms, and there

develops in the animal organism a complex set of neuro-muscular mechanisms functioning in the reflex adjustment of the various sense-organs for the efficient reception of stimulation. For example, there is the reflex path through the nervous system which makes it possible for an auditory stimulus to release a reflex accommodation of the eye to the sounding object. Such a neuro-muscular mechanism is operative in our organisms when we *hear* an unusual sound and reflexly turn the head so that we are prepared to receive further knowledge of a *visual* sort concerning the object to which we have now become attentive. Other such reflexes that serve this process of knowledge-getting are the so-called exploratory movements of the anterior body-muscles, resulting in an adjustment of the sense-organs located at the head-end of the body, in a way that favors the reception of stimulation of maximal intensity on the part of these organs. The process of perception, of noting objects in the environment, which is the basis of *knowledge*, is thus seen to be made possible by certain typical bodily actions that place the organism 'at attention'—resulting in part in the temporary inhibition of other modes of overt response. When the organism is prepared for observation, for clear perception of the object, other activities are suspended, for a time at least.

Similar reflex mechanisms and similar inhibitory processes may be noted also in the case of the other cognitive functions. Whatever other items may ultimately be found involved in reflective thinking, it clearly involves characteristic bodily reflexes tending to hold up overt action; and in this case there is a tendency also to prevent peripheral stimulation of the organs of special sense from gaining ascendancy. Wrinkling of the forehead, scowling, closing of the eyes, standing still, and other such reflex acts functioning in the inhibition of overt behavior on the part of the person 'lost in thought,' have been mentioned

by DeSanctis as typical of ideational attention; they constitute mechanisms inhibiting for the time being other biologically determined or habituated action-tendencies.

The behavior, then, that fosters the attainment of knowledge,—whether in the exploratory movements and in the adjustment of sense-organs, that both in animals and man are basic to empirical knowledge of the environment in perception, or in the reflective attitude that is characteristic of ideation and thought,—this behavior results in a slowing down or temporary inhibition of the direct and immediate responses of the inherited and habituated types to the stimuli presented.

This being the case, it should be no matter for surprise that this should be reflected in human behavior in an age whose keynote is scientific control. An inspection of the behavior of those who truly partake of the scientific spirit and who go in quest of knowledge, reveals the fact that when science systematically counsels careful empirical scrutiny of facts and a weighing of implications, it establishes as an explicit method of scientific procedure what is already implicit in those acts of exploration and sensory adjustment that may be observed in simple form in the lower stages of biological development.

It is of the essence of the scientific attitude to inhibit reactions wasteful of energy—and to make instead fine adjusting movements under conditions of emotional quiet; and if this carries over as a more general habitus of body and mind, we should expect the same thing in the general conduct of affairs in the social, economic, and political fields. In this respect the marks of a truly scientific age would be the cultivation of good judgment and elegant skill, to replace wasteful driving action in the social, economic, and political life. And, so far as Naturalism is a name for a method of action, that method is essentially the method of science,—a method of cool common sense,

which means in the last analysis, the intelligent adjustment of means to ends. Such is the spirit of science.

Even though we hold no brief in defense of contemporary culture,—since it is our purpose rather to understand it,—we may submit that if it has seemed to some observers that there has disappeared from our age a certain operative intensity on the side of action so that the change is noticeable even among our Nordic peoples, not all this decrease of intensity of action is to be attributed to a lowering of enthusiasm accompanying the naturalistic outlook of our day,⁴ but a part, at least, is attributable to the fact that *knowing* has come to play a larger part in our modern world and that the spirit of the age has come to partake, at times, and in some measure, of the attitudes that foster careful observation and perception of fact and first-hand judgment on the basis of fact. It means that the temporary quieting down or inhibition of impulsive action, that is characteristic of attentive observation and thought, has come to be reflected in a measure in the behavior of our modern world. It means that dogmatic imposition from without is no longer so easily compassed; hence the louder tone of those who ‘view with alarm’ the growth of any new heterodoxy in religion, in education, in morals, in science, or in medicine. The loudness and irritated tone of many latter-day dogmatizers betray a consciousness of impotence with the people of an age that has still some spiritual consanguinity with the Renaissance and the later revolt against dogma, out of which grew the impetus to modern science. In an age in which humanity has supposedly ‘become twenty-one,’ attained its majority, it is not surprising that the individual citizen should occasionally make observations and think for him-

⁴ *Vide* Frank, Glenn: “The Outlook for Western Civilization: The Literature of Despair,” *The Century*, cx, 1925, pp. 370-380.

self, and thus become somewhat less amenable to the machinery that guides public opinion from without.

The age no longer moves within the realm of homely allegiance to the florid vacuities that functioned so effectively as slogans for focusing attention and directing action in pre-Darwinian days, when 'oratory' was an accomplishment characterized by graceful ease and was the legitimate tool of statesman and priest and of moulder of public opinion. Leaders have a more difficult task today than in the days of Henry Clay and Daniel Webster in 'putting themselves across';—as a result they become conscious of effort, get out of *rapport* with their public, and sometimes descend, not always to the honest harangues of the leader of an older day, but to attempts to manipulate the public mind according to the 'principles' that may be acquired in a course in advertising or salesmanship. The machinery creaks.—It is difficult to 'lead' in such an age, and therefore those who are not equal to the task of legitimate leadership fall often into the rôle of manipulators.

In a measure, then, observation and thinking, rather than simple acceptance of beliefs, have become the mark of the age. And this accounts in part for the diminished ease with which men are taken off their feet by uncriticized hypotheses, whether in politics, religion, education, or conduct, as might occur more readily in earlier centuries or with less sophisticated publics.

We are not here, however, concerned primarily with problems in social psychology that are involved in the difficulties of latter-day leaders in controlling public opinion, but rather in analyzing the original physiological equipment on the basis of which there have developed the biological attitudes and behavior-tendencies that constitute the human an inquisitive species; for it is in the possession of these characteristics and in the exercise of

these action-tendencies on the part of individuals that the social problems of human civilization arise. Our review of the data reveals the physiological basis of these characteristics to reside in certain reflex tendencies like the adjustment of a sense-organ, in certain neurological mechanisms that bring about a coöperation of various sense-organs, in the reflex inhibition of other acts that might interfere with the attitude of attention, in related reflex tendencies, like wrinkling the forehead and closing the eyes, facilitating concentration of attention in thinking, and, finally, in the reflex inhibition of overt action, as when the organism stands still, lost in thought. It is because of the fact that these reflexes have somehow developed into more elaborate mechanisms in the human species than is the case in the lower animals, that its species-name, *Homo sapiens*, is justified. Not that these particular considerations were necessarily entertained by the biologists who officiated as sponsors when the attribute of sapience was fixed upon as the distinguishing mark of the species on the day it was written into the biological baptismal register. But, at any rate, the makers of biological geneology hit upon a significant *differentia*. We have traced in outline the development of this *differentia* and the beginning here made points a way in which the ancient epistemological problem of philosophy, the problem of the relation of knower and knowing and known, can be stated in a simple and illuminating way,—for it means that the question concerning the process of knowledge and of the scientific quest is put into a naturalistic, biological setting, and may now receive scientific definition.

VI.

THE DISTORTION OF TRUTH: ITS PHYSIOLOGICAL BASIS

ASSURED though we may be that the human animal is a creature that sometimes desires and seeks knowledge, it is certain also that sometimes it shuns it. And as the quest for knowledge has its basis in certain specific behavior-tendencies, such as the so-called exploratory movements, which may be traced to the original endowment of the organism in its various reflex systems, so, too, the tendency to shrink from knowledge may ultimately be found to possess a physiological machinery, a part of which is not beyond analysis.

Many are the data on this point. Here, however, we would indicate as simply as possible the nature of the mechanisms which function in the shunning of fact and truth and in the distortion of judgment. And we would sustain solicitously, even though briefly, one consideration, *viz.*: that those mechanisms are not to be conceived as mere hypothetical postulations or vague metaphysical abstractions, but are to be understood in terms of definite bodily functions.

The existence of mechanisms for the distortion of judgment of fact was clinched long ago in the classical account of Æsop's fox. The fox of the fable 'desired' the grapes and for a while jumped lustily after them. Then presently he stopped jumping, turned away, and affirmed that the grapes were sour, though he had not tasted them. Here was an unwarranted judgment without foundation in experience of fact.

The fable indicates that already in Æsop's day the fact of this sort of distortion of judgment and knowledge was noted as a foible of the Reynardian and—may we so inter-

pret Æsop?—of the human constitution. The psychophysical organism selects the beliefs that make it feel good; and it may, at times, have no concern for fact and truth.

To understand the underlying mechanisms of this process we would note briefly the fact that the physiological functions involved in a heightening of the tonicity of the external, skeletal, muscles stand in a relation of mutual antagonism to the processes involved in a ready digestion and assimilation of food on the part of the alimentary tract. Cannon¹ has pointed to the opposition between the action of the tract and the endocrine action that favors the tension of these outer muscles of the body, as a physiological relationship basic to certain phenomena of emotions like anger. Bickel² has described a similar opposition between the vasodilation in the periphery of the body, particularly in the muscles, and vasodilation in the viscera. In all such physiological opposition the action of the one process tends automatically to inhibit the other. When we have been running and then sit down to a meal, we find that the excitement of running has been instrumental in interfering with the normal digestive action of the alimentary tract, from which the blood has been withdrawn to supply the muscles in running. There may be noticeable at the time also an œsophageal constriction that tends to interfere with the swallowing of food,—a device adapted to prevent food from entering the digestive tract under conditions when the tract is unfit to receive it. The same opposition between strenuous action and the digestive processes is operative in the reflex tightening of the œsophageal muscles induced by the state of tension

¹ Cannon, W. B.: *Bodily Changes in Pain, Hunger, Fear and Rage*, New York, 1915.

² Bickel, H.: "Ueber die normale und pathologische Reaktion des Blutkreislaufs auf psychische Vorgänge," *Neurologisches Centralblatt*, xxxi, 1914, pp. 90-97.

in the outer musculature of the body under conditions of long-continued anxiety. Again, when we bolt our food while we are in a state of muscular tension induced by strenuous work or during emotions like anger, we discover that the stomach does not digest the food and may even reject it in a vomiting reflex. And, finally, the same opposition is operative when the long-continued tensions of anxiety-neuroses induce a predisposition for vomiting spells. Conversely, when the animal has ingested a satisfactory meal, the body musculature tends to relax while the alimentary tract is digesting and assimilating the food. Not only does the cat lie down and go to sleep after a full meal, but the same tendency in human physiology may cause both host and guest an agonizing hour when they attempt to keep up the appearance of a keen interest in conversation after a hearty Sunday dinner, while the organism is keyed for a half-hour nap.

Now it is in such interrelationships of bodily processes that we may find the physiological basis for the interplay of the determining tendencies that are operative in the wishes, desires, aims, and purposes of the individual. In such interrelation of fundamental physiological processes will also be found the conditioning factors for the changes or shifts in these desires and attitudes. In the case of the fabled fox the determining tendency involving aggressive striving and straining after the grapes, which are envisaged as sweet and as entirely desirable, tends to inhibit the functioning of the alimentary tract. At a certain point, —during the ‘refractory phase’ in the action of attending to the grapes, perhaps,—the organic set changes automatically; alimentary revolt tends to set in: the state of muscular tension, long-continued, and accompanied by the typical withdrawal of blood from the viscera to the periphery, is preparing for the supervention of incipient nausea. This nausea need not lead to vomiting; it is, how-

ever, a symptom that the alimentary tract, hitherto inhibited, is becoming active after another manner and may presently contract violently and empty out its contents in vomiting. But even though it does not come to that, the incipient keying of the alimentary mechanisms in this direction tends to inhibit the vasodilation in the outer body-muscles and to change the set generally, so that the muscular tension of strenuous effort suddenly disappears. There is a shift in physiological set, the tonicity of the skeletal muscles gives way to relaxation, and the fox bows himself off the stage. And if *Æsop's* observation is correct, there may at this point be substituted also for the idea of sweet grapes, the unwarranted judgment of their sourness.

It is in this dialectic of determining tendencies, thus conditioned by the interrelation of organic processes, that there resides the basis for distortion of many of our judgments. The organism, keyed by the incipient response of food-rejection, has been affected in this keying or set not only in the action of the nervous mechanisms directly involved in the innervation of the muscles and glands of the alimentary tract and in the related nervous mechanisms involved in a reflex turning away from the food, but what is more, also in the action of the cerebral centers in which there is called into play the associative mechanism involved in the rise of the 'idea' of sourness. 'Sourness,' incipient nausea, and the act of turning away have all come, in the fox, to belong together, as component parts in a total psychosomatic function or determining tendency, so that when the visceral process and the overt act appear, the idea of 'sourness' tends to be brought in also. The fact, however, that perception and ideation, as well as action, are thus determined by the particular attitude, *Einstellung*, or set, operative at a given time, is patent enough; here we would point rather to the mechanisms

which condition the change from one such psychosomatic set to another. Hereof is much of the ground for the shifting from desire to desire, from purpose to purpose, from viewpoint to viewpoint; and hereof also the ground for much of the seeming contradictoriness in the life of feeling and of thought in the normal human being.

Such is the physiological basis of many human judgments, and thus are many of the ideas and judgments selected that are accepted and passed on by the individual and by society. Thus arise many of the postulates which are accepted as 'truths' by which we are 'moved' and seek 'to move' our neighbors. It was upon this very manner of selecting 'truths' that, in its day, philosophic Pragmatism seemed, to many, to place the stamp of approval. Its surprising popularity was made possible, perhaps, because it seemed to sanction a temporary rest in a 'pluralistic' universe where one might have many 'truths' that need not be in logical agreement with one another but were 'selected' rather on the basis of their agreeableness to ourselves.

As one now looks back upon those days, one sees how Pragmatism may have been a half-way station in the passage from a theistic to a naturalistic conception of the universe. In such a station the shorn lamb might temper the wind somewhat to its own comfort. As the wool grew longer and when the wind abated, the lamb might be quite naturalistically-minded; but when the storm raged it would get an access of warmth by turning in the direction of theism. Something of this we noted even in the most robust of naturalists.

The thing desired in matters of hypotheses concerning man's relation to the universe was comfortableness; and when Huxley is at great pains to disavow "systematic materialism" on the ground that it "paralyzes the energies" of man and robs life of beauty, there is a clear indi-

cation of the operation of the same pragmatic tendency in the justification of this disavowal, as in the case of the little old lady who objected to the study of physiology on the part of her granddaughter on the ground that it wasn't nice for a young lady to know about her insides. Though with a difference: Huxley's pragmatic disavowal of a materialistic metaphysics,—a disavowal that involved denial of certain uncomfortable implications of his working hypothesis,—results in a distortion of logical consequences in thought, as the action in the fox results in distortion of matter of fact. The little old lady, on the other hand, does not blink the fact that human beings possess visceral organs; she simply prefers ideally the young person whose attention is not engrossed with matters of anatomy. Hers is not a distortion either of 'reality' or of 'thought'; it is rather a taboo which she places upon knowledge for others. It is the former reaction primarily that interests us here. But in both there is revealed the manner in which knowledge and thought are vitally affected by the operation of organic processes. For when Huxley shrinks from envisaging the human personality committed to a point of view that might, in his opinion, rob it of a certain beauty and paralyse its springs of action, and when the little old lady rejects an educational procedure which, she fears, might produce a personality at variance with the Victorian ideal of womanhood,—there is operative in both cases a physiologically grounded concern as to the manner in which certain items of knowledge and thought, certain 'ideas,' are supposed to affect the character of those who entertain them. This concern is all of a piece with the 'love' that is physiologically the matrix of the parental attitudes and behavior-tendencies. When the organism is thus keyed it is not always truth and logical consistency that are espoused. Indeed, the quest after knowledge, as 'native' impulse, desire, or

striving, is clearly at a disadvantage when, as 'original' tendency, it comes up against other, more fundamental, action-systems.

The analysis has revealed, in particular, one manner in which the operation of the processes of knowing is affected by these more 'fundamental' biologic trends. We may, if we wish, see in the distorted judgment concerning the grapes the operation of a beneficent nature which has prepared, in the neuro-glandular system, a device by which the fox is saved from continuing, to the point of exhaustion, the expenditure of muscular energy in quest of food. But the fact to be noted is that such physiological mechanisms function also in determining and in distorting our judgments and hypotheses;—and that while they may serve effectively in keeping the organism away from the pursuit of objectives that may be, at the time, not consonant with immediate biologic well-being, they often do so at the sacrifice of 'knowledge' and of 'truth.'

VII.

THE PHYSIOLOGICAL BASIS OF THE TABOO UPON KNOWLEDGE

WHEN we envisage, in their physiological setting, the behavior-trends that are basic to the activities involved in knowledge-getting, we discover that not only does the 'normal' functioning of bodily processes tend upon occasion to distort the content and meaning of ideas and even of perceptions after the manner of Æsop's fox, but also that the organization and the interaction of these organic processes may operate in specific ways in preventing the rise of new ideas and hypotheses. And we may therefore ask: what is the nature of these reactions, which constitute the organic basis for the taboo upon the individual's search for knowledge, and hence also for the taboo upon the attitudes and activities peculiar to the scientific quest?

Let us bear in mind that the major life-processes carried on in the expenditure of energy, in recuperation during sleep, in digestion, and in procreation, have been organized as physiological functions through a long biologic history,—quite apart from the elaborate habits that have developed around them. It is the patterning of these world-old organic processes that determines in large measure the course of our lives, and guides them along pre-arranged physiological grooves. And our experience, running its course under this sort of determination, possesses a tang or flavor of immediacy which comes to consciousness as a certain "worthwhileness" as Drever in his essay on *Instinct in Man* calls it. We feel at home within this pattern of life, and this quality of at-home-ness extends and attaches itself to the habits that develop about the various original action-tendencies. It gives us that

feeling of "intimacy" which, as James points out, attaches to experience as *our* experience.

Now analysis and reflection tend distinctly to rob the inherited and habituated action-systems of this very quality. And the psychological mechanisms involved are not unknown to us. Miss Washburn¹ has dwelt upon the processes of disassociation called out by prolonged attention to a stimulus. In the field of acquired associations we are all acquainted with the manner in which prolonged attention to the sound of a word results in divorcing the sound from the meaning. Similarly, focusing attention upon the elements of some automatic activity may produce the same sense of strangeness, the same loss of the quality of immediacy and intimacy. But what is more, it tends to change in some way the coördinations between the sensory stimulus and the muscular reaction. The centipede that, according to the children's rhyme, lay distracted in the ditch when he started to consider which leg he put before the other in walking is a case in point. The rhyme clinches successfully a subtle observation in the realm of mind. Angell² points to the fact that at the focus of attention two functions are continually going on when our ideational and perceptual complexes in each successive pulse of attention are reorganized. Each new patterning involves, as he puts it, both analysis and synthesis.

Attention, then, may not only rob these automatic processes, on the side of mind, of the quality of intimacy and invest them instead with a feeling of strangeness; but it may also, on the side of bodily processes, function in upsetting the automatized motor tendency. Just as in the process of attending to an object the psychological patterns of the perception of it are constantly changing, one

¹ Washburn, M. F. and Severance, E.: *American Journal of Psychology*, xviii, 1907, pp. 182-186.

² Angell, J. R.: *Psychology*, 4th edition, revised, New York, 1908, pp. 103-108.

being replaced by another, so also the organization of movements may become modified under attention. And it is not only the acquired habits that may be affected in this way; for attention may disturb also the patterns of those fundamental organic tendencies that enter into the warp and woof of our economic, social, and political life. The origins of our institutions lie in the unreflective give and take of these biological processes. Attention may upset the sensory-motor coördinations in walking when one thinks of one's legs as one is moving across the stage in the limelight; so, too, observation and reflection may result in disturbing the complex patterning of the basic organic processes on which our most elaborate institutions are built up—the church, the family, the newspaper, and the bourse, or, in the past, the changing forms of slavery, of chivalry, of statecraft and diplomacy.

There is something here that is vaguely dreaded by the individual and by society,—it remains sometimes inarticulate at the level of feeling, but the emotive machinery is often all the more effective, on that very account, in reinforcing the opposition which the hereditary and the habituated sets of the organic processes offer to the supervening of the attitudes of attention and reflection and their related action-mechanisms that might lead to knowledge. Here are the situations in which many inward thou-shalt-nots or taboos come to be felt to be vaguely, but powerfully, operative. At times there may be felt also to attach to the original patterning of the physiological processes a certain sacredness and a dread lest attention to them might upset them and destroy something as in the case of the water bug of the poem, who “glides upon the water's face with ease, celerity, and grace, but if he ever stopped to think of how he did it, . . .”

Here may be seen a physiological foundation for the motive in the legend of the tree of knowledge. The adoles-

cent stage is full of such awarenesses—all of which seem to point to the same conservation of the ancient physiological pattern as the basis of the individual character, under circumstances when that pattern is in the labile stage. Vaguely felt impulses are often inhibited immediately, before they have a chance to associate with themselves either an overt act or a clear perception or idea of stimulus or situation. Thus the final organization and fixing of the fundamental physiological trends goes on in large measure outside the field of attentive consciousness. Under these circumstances there might be possible the unfolding of a personality in which the patterning of the fundamental physiological trends becomes organized without interference by processes of reflection on the problem of good and evil. Such a development has sometimes been pictured in Romantic literature as in *Paul et Virginie*³ and in *Heinrich von Ofterdingen*.⁴ Heine, over-reflective, would wish to guard the development of such a personality when he says, “*Mir ist, als ob ich die Hände aufs Haupt dir legen sollt’, betend, dass Gott dich erhalte, so rein und schön und hold.*”

Heine, however, still has a poet's fine regard for freedom; he does not legislate nor does he attempt to coerce; and though he might wish to place his hand on such a one's head, he refrains;—he simply registers the desire in a poem. Yet out of this same appreciation of the ‘pitfalls of knowledge’ and out of the desire to guard humanity from them, grows much of action aiming at social coercion. There are various stages as one passes from Heine's reverent attitude to a stage of intellectual concern such as that felt by Mr. Balfour—over the possible effect upon character when Naturalism shall have succeeded in under-

³ Saint Pierre, J. H. B. de: *Paul et Virginie* (trans. by Melville B. Anderson), Chicago, 1912.

⁴ Novalis: *Ausgewählte Werke in drei Bänden*, Leipzig, 1903.

mining the ancient theistic sanctions, then to a stage of aggressive program-making such as that of Bryan,—until one finally loses oneself in all sorts of coercive prohibitive movements in which men 'view with alarm' this, that, and another tendency and seek to protect the public from it by the action of committees and legislatures.

Out of this complex of motivation the spirit of dogma derives its power. This complex involves many types of impulses. It may be founded on the exquisite shyness of youth as it closes the door upon some vaguely felt impulse that is not allowed admittance to reflective consciousness, or on the chivalrous movement of the spirit of those who would guard the innocence of childhood, or on the cruel lustfulness of the mob that participates lawlessly in the lynching of some negro, or 'lawfully' in the burning of Savonarola. Here in our analysis we come also upon the psychophysiological mechanism of the taboo upon knowledge, which functions in restricting the field of empirical inquiry. And we see, again, that while there is a physiologically grounded tendency toward such empirical investigation—a tendency exhibited in specific action-trends such as the exploratory movements of the earthworm and the ant, or in the adjustment of a sense-organ in attention,—there is discoverable also a physiological machinery for the inhibition of that tendency. In these physiological processes resides the real opposition. It is not a conceptual opposition, such as that between a naturalistic and a theistic hypothesis, but a physiological one between the investigative tendencies of exploration and attention on the one hand, and on the other hand all those other behavior-mechanisms that have been built up as definite muscular and glandular responses to specific stimuli. Many of the elements in these latter are of the hereditary sort. We need not anthropomorphize these as

'instinct-forces' that brook no interference, but we can see in the opposition they offer to the investigative tendency, the physiological basis for the operation of many of the thou-shalt-nots, and it appears at once that these are not all socially imposed but are conditioned by the workings of the basic physiological tendencies themselves.

In a word, over against the exploratory, inquisitive, action-tendencies resulting ultimately, perhaps, in the activities of scientific inquiry with its implications of the possibility of radical changes in the behavior of the individual and of society, there are the basic general tendencies which are fundamental to the life-processes upon this planet and which dominate the action-systems of man. These fundamental trends may operate to the detriment of truth in knowledge and thought, not only by producing that distortion of fact which we noted above, but also they may function in inhibiting directly the tendencies of exploration and attentive inquiry. If the former tendency has found philosophic formulation in some forms of Pragmatism, the latter finds its formulation in the theory of dogma as expressed, for instance, by Cardinal Newman⁵ and by Cardinal Bourne, the present Primate of England.⁶

But neither the pragmatic predilection for the pleasant or the 'useful' rather than the true, nor the enjoining taboo upon the quest for knowledge, are matters primarily of social origin. Their bases are already laid in the original physiological constitution of man,—in the antagonisms and oppositions of the original behavior-tendencies to one another and more particularly in the opposition of the more fundamental of these trends to the relatively weak tendencies that are basic to the inquisitive

⁵ Newman, J. H.: *Apologia pro Vita Sua*, London, 1864; also, *An Essay in Aid of a Grammar of Assent*, London, 1903.

⁶ Bourne, Francis: "The Union of Christendom," *Columbia*, iv, 1924, No. 3.

scientific attitude. These latter are, after all, but phases of the major biological trends.—Man is not primarily a knowledge-seeking creature. There are times when 'life' itself would seem to place a taboo upon knowing the truth.

VIII.

EVOLUTION AND BIOLOGIC FINALISM

THE various behavior-trends in man may be seen to operate sometimes in the direction of inhibiting not only the action-tendencies of an opposite sort but also the associative processes that might lead to a discovery of certain logical implications of ideas, concepts, or hypotheses. This may be observed, for example, in the neglect of some significant implications of the evolutionary hypothesis in contemporary endeavors to spread the doctrines of Naturalism. Whatever the aim, these contemporary expositions often lack the vigor evident in many of the presentations of the evolutionary point of view of half a century ago. And this appears to be not because of failure in that sincerity of the democratic attitude which wishes always to share with open mind the knowledge of the relevant facts; but rather because there is often an absence of clear-cut objectives, both in the intellectual and in the moral realms.¹

As we review the last half-century, it is clear that the evolutionary hypothesis promised at first, to many minds, to become an energizing one in Western civilization. It promised assuredly to give a wider sweep to humanity's outlook upon life and upon the universe in which it lives. With Democracy, it promised to give a forward direction to human effort and the freedom that knowledge brings to the human will,—instead of the backward direction given to attention by tradition and the state of tutelage in which those governed by the authority of dogma find

¹Frequently these endeavors are characterized by a certain militancy aroused perhaps by a felt need of defending some of the established agencies in education, religion, or medicine, or in the economic or political life, and this solicitude operates often in the direction of dispelling nimbleness and clearness of thought.

themselves. Those who were completely steeped in the data glowed not only with the enthusiasm born of the free play of the scientific faculties, but also they were thrilled in their æsthetic and moral natures by the imminence of prospects and visions which, it was felt, would in some way open up new possibilities for man himself. Like "that blessed word Mesopotamia" which, in the beauty of its sound and in the sanctity derived from being printed on the pages of the Holy Book, is said to have thrilled a certain colored lady through and through—so the conception of a process of unfolding, an evolving, seemed to hold the possibility of releasing a thrill in the individual and a certain attitude of expectancy, of forward looking, in Western society generally. A close second was the word 'progress,'—and the phrase 'evolutionary progress' promised for a time to take over much of the power and affective tone of the ancient Providence, ineluctable and benevolent. The very sound of the word 'evolve' and the type of imagery that accompanied it, as of a helix screwing upward into space, tended to reinforce the implications that might urge man 'onward' and 'upward' always.

Yet these possibilities that seemed inherent in the naturalistic viewpoint were not realized. Sir Michael Foster remarked the tone of depression that had tended to attach itself to the naturalistic outlook already in the early decades of its awakening. He observed, too, that it was a depression that took hold, for the most part, of those who had regard for, but did not participate in, the work of research. Outside that scientific world there were but few who caught the deep significance of the biological point of view, and fewer still were enraptured by its subtle implications. The possibilities it held for a larger human striving were not generally grasped, and the freedom which it gave became sometimes a freedom from the wholesome restraints imposed by the attitudes of rever-

ence for the life and 'rights' of other beings, both human and animal,—elements that were once thought to enter into every worthy ideal of human character. To those interested in the ethical aspects, the removal of such restraints might represent a distinct moral loss, and it is this disappearance of certain 'values' from our world that the young Mr. Balfour anticipated and that gave him such concern; perhaps also these are the things which Huxley vaguely dreaded when he was at such pains to repudiate "systematic materialism."

If we abstract, for the moment, from the fact of this shift in emotional and volitional attitude—the shift from the attitude of expectancy and hope to that of anxiety and perhaps despair—and examine into a possible change in emphasis upon certain implications or perhaps interpretations of the conception of biological evolution, we discover one such event that is of primal significance inasmuch as it bears upon our working notion of man's place in the evolutionary scheme: it is the rise of the conception that biologically the human species has become structurally stabilized and that evolution in the future will be a matter not of anatomico-physiological modifications but of social adjustment, crystallizing in the form of new customs and institutions, and of the elaboration and multiplication of material facilities.

Sociologists, in particular, have actively promulgated this belief,—often putting it out in a form that lends to it an air of scientific finality. We quote from a formidable volume on sociology in which biological evolution is referred to as a phenomenon that "may be said to have been exhausted," and to be "no longer visible in man." We are told that "the fact probably is that each of the races that is or has been the bearer of a high civilization is developed up to or near the limit of possible advantageous variation, each differing from the other slightly

in the direction which its development has taken, but each having carried its particular type of development to the limit beyond which lies insanity and various forms of nervous breakdown." We are also told: "It has been suggested that in man the sensitiveness and complexity of the nervous system, which is the biological speciality of the genus *Homo*, has been carried to a point beyond which it cannot go without excessive liability to breakdown." Again, "there now appears to be no scientific basis for the idea that the present rich complexity of human endowment will ever be materially exceeded."²

The quotation speaks for itself. It announces a doctrine of Biologic Finalism: the process of organic evolution has now evolved on earth that biologically stable species which shall remain in possession of the little ball until it grows cold and wrinkles with age.

The picture is interesting, and its very interest assists in the substitution of a 'societal' evolution for an organic one.³ The growth and decay of customs, *mores*, and institutions, within the various culture epochs of human history, to which our attention is thereby called, present, indeed, a fascinating field in which the conception of development has been fruitfully applied. The facts gleaned in the comparative study of human cultures, however, have suffered the construction that the course of cultural growth and decay follows a fundamental pattern which repeats itself in the various cultural epochs, so that these processes of societal growth (and decay) might constitute, indeed, a *development* similar to that which occurs in the individual organism passing from stage to stage of the life-cycle typical of the species, but come not at all

² Hayes, E. C.: *Introduction to the Study of Sociology*, New York, 1915, pp. 179, 243, 280.

³ "Societal evolution," writes A. G. Keller, "is the new mode or grade of evolution that replaces for man the organic mode or grade." (*The Evolution of Man*, ed. by G. A. Baitsell, New Haven, 1922, pp. 126 ff.)

under the category of an *evolution* characterized by the rise of new patternings of these processes in the course of such cultural development, similar to the occurrence of new species in the biologic order. The envisagement of the facts of cultural history in the light of this distinction has led sometimes to the hypothesis that 'progress' is illusory—that the actuality of cultural evolution is not attested by the facts. This conclusion does not concern us here; but the clear-cut conceptual distinction elaborated in this envisagement, when applied to the facts from which that conclusion was drawn, provides an effective means for dispelling the confusion produced by the intellectual legerdemain involved in the substitution of a cultural evolution for the organic one, which is assumed to be in abeyance in the human world. For in the light of that distinction between a *developmental* process and an *evolutionary* one the question, What are the warrants for the assumption that organic evolution has reached its term? acquires a new significance.

When one is for the moment sufficiently detached from one's humanity, one may, indeed, wonder why the question is so seldom asked even by the more aggressive proponents of the evolutionary doctrine. Following upon Bryan's initiation of an active fundamentalist campaign championing special-creationism, there came a flood of pamphlets whose tenor is for the most part that instead of the six days of Genesis we must postulate æons of evolution. Yet one may wonder how it is that in a world that can be so stirred by the doctrine of special-creationism, Biologic Finalism is so often tacitly assumed even by those who speak most vigorously against special-creationism. One wonders whether they or the followers of Bryan would be most likely to entertain without disturbance of equanimity the possibility of a biological variant emerging from the human species, somewhat after the manner

portrayed in Mr. Shaw's *Back to Methuselah* and Mr. Wells's *The Food of the Gods*,—a species similar, yet also very different functionally and presumably therefore somewhat different structurally from the human—and taking possession of the earth.*

It will make a difference whether the possibility of such a situation is pointed to by the romancers or whether it presents itself to us as actually implicit in the evolutionary process which, unless the empirical evidence has misled us, is operative throughout the entire biologic order.

If the possibility of a new species upon this planet is presented to us in the former situation, the thought may be accompanied by hardly a ripple upon the surface of our equanimity; but if this possibility occurs to us when our spirits are tinctured through and through with a knowledge of, and a deep regard for, the facts of biologic evolution and of man's relation to the biologic order, then our reaction may be quite otherwise, and the attitudes that support the latter-day dogma of Biologic Finalism, often tacitly assumed as a practical working hypothesis, may become unpleasantly disturbed. Yet this doctrine of Finalism has no firm foundation either in the major evolutionary hypothesis or in the empirical data of biology. As a dogmatic reaction-tendency it constitutes a phenomenon in itself interesting to the biologist and the social psychologist, and perhaps also to the student of ethics.

Biologically, the dogma is the product of the operation

* One wonders whether the appearance of such a variant would not make us uncomfortable, or stir our human *amour propre*, at least, even though it were to tolerate us somewhat after the manner in which the small boy accepts his friend the dog. It is not always after this manner, let us note, that a member of one human race attitudinizes toward his fellow-humans of another race. One wonders whether, along with discomfort at the emergence of such a new species, we would perhaps make also incipient movements aiming in the direction of the destruction of such a species—or at its incarceration and, if we could compass it, its physiological sterilization.

of specific reaction-mechanisms of the defensive group that serve the maintenance of the species-character. From the point of view of social psychology the general acceptance of the notion that physiological evolution has come to a stop in man is favored as a result of the functioning of organic processes, of high emotive coloring, operative not only in the elimination of modes of behavior that vary from the socially established pattern but also in maintaining the existing biological norm. For a systematic philosophy of morals this doctrine of Finalism presents a good instance of the non-rational origin of beliefs, and of the pragmatic slant concerning 'usefulness' as determining the acceptance of beliefs. The rise of this notion under the particular situation created by the spread of the major evolutionary hypothesis during the last half-century,⁵ constitutes field material, as it were, whose origin and development has gone on under one's very eyes and need not be laboriously reconstituted.⁶

⁵ The study of the physiological reactions and the accompanying emotive processes that operate in maintaining not only this belief but also the disapproval, discouragement, and distrust of biological variations, may give us a new appreciation of the direction in which that school of British moralists was heading which spoke of a 'moral sense' that apprehends the 'nastiness' or the acceptableness of an act, as directly as did the sense of vision the redness or the blueness of an object. According to this school the moral acceptableness of an act did not derive from some intellectual principle, as in the Kantian ethics, but from something nearer the biological level; indeed, there is often a suggestion in the tenets of the school that the acceptable in the way of action is that which a man of sound instincts and good breeding could 'stomach.' And it is only latterly that we are beginning to see how important is the part played by the reactions of the digestive tract in the determination and control of overt behavior!

⁶ It is significant that in the contemporary set-to between evolutionism and fundamentalism, both sides are equally willing to give their attention to the whence of man; but one wonders whether or not they would show their essential 'humanness' in an emotional predilection for the notion that physiologically evolution has come to its term in man. In the minute recently adopted by the Council of the American Anthropological Association "in view of the objections raised against the theory of evolution" we find, however, the following: "We must conclude that the bodily form of man . . . is still changing, not in the course of centuries, but in long periods. The exact cause of changes in the form of organisms and the conditions under which

When, for instance, we read the accounts of Dr. Geley⁷ of France and of Freiherr Schrenck von Notzing⁸ of Germany, concerning curious 'ectoplastic' phenomena, which they claim independently of one another to have observed in the case of persons from whose bodies there is said to have exuded a substance that took on forms bearing more or less similitude to human beings,—a variety of attitudes may be called out in us either of acceptance or of rejection. Among such tendencies we may note perhaps a certain physical withdrawal, or a deep-moving physiologically grounded æsthetic revulsion, or even a certain disgust, at the thought of the possibility of such ectoplastic processes as part of the human, in a word, *our*, physiological *repertoire*. Here in this physiologically grounded movement of rejection and in the emotive processes that accompany it, we have a typical case of one of the mechanisms that may function not only in keeping the organism true to the norm of the species but likewise in protecting the socially established code of custom.

It is a psychophysiological mechanism similar to this that has been operative in the precipitation of the doctrine of Biologic Finalism, not as a reasoned deduction from the hypothesis of organic evolution nor as an induction from the empirical data, but as a tacit assumption implied in certain current attitudes and action-tendencies in our contemporary world. It is, indeed, a dogma in a genuine sense, though one imposed not so much by exter-

they occur, as well as the causes making for stability, are still imperfectly known." (*Science*, lxiii, No. 1631, April 2, 1926, p. 351.) From the point of view of a social psychology we may here observe how the controversy as a social fact may possibly become the matrix out of which may be precipitated new attitudes and a new orientation of will. But the fruitful realization of such a possibility lies still in the future.

⁷ Geley, Gustave: "La physiologie dite supranormale et les phénomènes d'idéoplastie," *Bulletin de l'Institut Général de Psychologie*, xviii, 1918, pp. 5-26.

⁸ Schrenck von Notzing, A. P. F.: *Materialisations-phänomene*, Munich, 1914.

nal authority as through the functioning of deep-rooted physiological reactions with high affective coloring. Our purpose here is simply to call attention to this conception, which is gradually becoming explicit in much the same manner as other concepts that have from time to time gained unquestioned acceptance, not on rational grounds but by reason of a physiological preference. It is thus that ideologies receiving dogmatic acceptance have probably arisen at all stages of culture in the past, as now in our own time, and as they may arise in human societies perhaps for a long time to come. In the case under consideration, it is a physiological dogma favoring attitudes which would maintain the character of the species unchanged,—in other words, it functions in offering opposition to the process of organic evolution.

In Biologic Finalism there is registered a certain attitude of the species, an attitude in which there is maintained a feeling of assurance with respect to possession of the planet, free from the disquiet that might be engendered by a call 'beyond man.' The occasional picture of some who listen to such a call and supposedly follow it, like Longfellow's youth who bore the banner "with that strange device, *Excelsior*," or like Shelley's Alastor, or like Eleutherios of Greek legendry, moves faintly to a smile, perhaps; such, it is felt, will not, for a long time to come, at least, inherit the earth, any more than the meek of Holy Writ. Or again, there are the pictures of a ruthless superman,—these, too, hold neither the imagination nor the will sustainedly enough, it is felt, to warrant the expectation of his establishment as a type; and what is more, he is none other than the bully and the bluff who is already sufficiently known. Still other suggestions may arise, but there is upon them usually the mark of the uncanny, and they are generally to be disposed of by an

assignation to the category of the 'pathological' or of the 'improbable.'

And yet, when, at times like these, the paradoxes and incompatibilities, felt to exist within the system of action-tendencies that constitute the habitus of the species, lead the individual, or perhaps an entire civilization, into the tangled paths of compromise where the conflicting tendencies operate in reciprocally stultifying one another,—then indeed may those conditions arise under which the conviction that the present psychophysiological habitus of man is destined to remain essentially unchanged, might be somewhat weakened. Strangely enough, however, this becomes an occasion, primarily, not for harbingers of hope, humanly speaking, but for expressions of apprehension over an imminent degeneration threatening the human stock. Programs are not wanting for 'doing something about it,' but even the more vital of these, looking toward a constructive stirpiculture, come under the cloud of a restrictive negativism. It is not so much that these programs are projected under the ægis of warranted scientific caution with reference to the possibility of the inheritance of 'acquired characteristics'; it is rather that they proceed upon the assumption that all the inherent possibilities of organic functioning are already manifest, and that it becomes merely a matter of selecting and fostering certain human types. Instead of stimulating attitudes of individual search and quest, they direct attention often to the shortcomings of one's neighbor. And in their more negative form they propose strange preventive measures—like the systematic adoption of lethal chambers, and other such, for the 'dysgenic,'⁹ to stem the dreaded decline of our humanity.

⁹ In a volume entitled *The Contributions of Science to Religion*, edited by Shailer Mathews (New York, 1924), Mr. Davenport presents anew the case for the extermination of the undesirable. "Society," he says, "is largely controlled by a perverted instinct—an instinct which is appreciative of the

Truly strange are these winds of doctrine. Heavy indeed, and filled with disquieting and baleful dreams, would seem to be the sleep in which the notion of Biologic Finalism enswathes the race; and few and far between, the moments when a solitary sleeper, here and there, rouses himself to query: Watchman, what of the night?

desire to live and blind to the value of death. That this instinct is perverted we see if we try to imagine the consequences of a world in which there were no death, in which the people of earlier generations piled up in ever increasing numbers, with all their somatic damages, the results of accident and disease accumulated through life. It is rather remarkable that normal society has made so little use of the death function to free itself of its acquired burdens of mental and physical defectives, though if the less well-endowed gain ascendancy, they use it freely to stifle competition'' (pp. 297-298). ''The principle of sterilization has been adopted by over a dozen states in the Union, but officials have been slow in the application of the principle because it seems to be in advance of public sentiment. No doubt, under proper control and used conservatively, the principle of sterilization by the State might become . . .'' (p. 296).

From the point of view of a psychology of social processes, this drift of opinion presents an interesting problem. When it defines the 'dysgenic' or 'cacogenic' individual in terms of the degree of his amenability to the *mores* of the group, it sets aside the criterion of physiological *Minderwertigkeit*, which is usually stated as the point of departure for these programs, and opens the way for the rise and development of the social attitudes that may operate after the same manner as did those which legend indicates in the case of the condemnation of Socrates and of Jesus, who also were adjudged 'undesirable' in their day. One recent account has it that this fate of Socrates and Jesus was pointed out to the dean of a small Ohio college, who was urging the citizens of his state to advocate the adoption of lethal chambers and sterilization for the 'dysgenic,' and he was asked how he proposed to safeguard such measures against a similar abuse in our own day. He answered that he did not know.

IX.

SOME NEGLECTED IMPLICATIONS OF THE EVOLUTIONARY HYPOTHESIS

THE method of science involves: first, description and classification of facts, secondly the statement of a general principle or hypothesis that organizes the facts, thereby 'explaining' them, and in the third place, the further elaboration of such hypotheses so that they point to possibilities not yet known concerning the nature of the facts. Hypotheses may thus function either in the explanation or in the discovery of facts. In the latter case they may be called heuristic principles.

Now the evolutionary hypothesis has served after both manners in the field of biology. And latterly it has focused biological inquiry upon the problem of the germ-plasm as the carrier of the heritable characteristics. Here quite legitimately the biologist is able to entrench himself in the pursuit of research, untrammelled by the clamor of demands for generalizations bearing upon the major problem of man's place in the universe, and for the most part he has referred such questions to the philosophy of morals, to sociology, and of late to psychology.

But these have not been always successful in taking over problems, and in their treatment of them there is sometimes an absence of that largeness of vision that characterized the less specialized protagonists of evolution of half a century ago. It takes a certain detachment from our humanity, or else a certain *naïveté*, to face some of the implications of the hypothesis of biological evolution, as did Tyndall when he envisaged quite calmly the future possibility of intelligences other than human on this planet, and unhesitatingly affirmed that the evolutionary series cannot be assumed to stop with man. And

it was this implication, pointing, as it does, beyond man, which gave such sweep and propulsiveness to the conception of evolution and promised to become a point of possible attachment for the attitudes that in the past had been attached in part to the religious ideologies.

Yet it may be pointed out that there are certain behavior-tendencies operative in man which might tend, even in those specifically interested, to inhibit the application of the evolutionary hypothesis as a heuristic principle,—a procedure which might lead to a systematic consideration of the possible direction of physiological changes of major as well as of minor sorts that would give us a picture of a changed humanity, in fine, a new species, physiologically. Tyndall's detachment led him to ask the question that may not arise so readily in the mind of the adult, which yet pops spontaneously into the head of the average youngster who is being made acquainted with the conceptions of Lamarck and Darwin and with the concrete biological data that fill in these conceptions: *viz.*, what's next? and when will it come?

Curiously enough, after Tyndall not much has been forthcoming that bears in any pointed way directly upon the question. There have been some pseudo-biological pronouncements concerning the 'superiority' of the Caucasian race, or of the Nordic strain,—a superiority presumably destining it for ultimate mastery of the planet; some anthropological evidence for the biological foundation of monogamy; some psychological essays on the general instinctive basis of the processes of culture; a good deal on the 'evolution' of art and of industrial technique; and, latterly, a popularizing program in which some biologists and some theologians combine on the question of improving the race by eugenic breeding but fail sometimes either in the matter of scientific enlightenment or in religious enthusiasm.

Much has changed since Tyndall's day. Yet the significant implication of the evolutionary hypothesis—the implication which he saw so clearly and so simply—abides. And even though there may have been operative certain factors that have diverted attention from it, the intervening years have precipitated data and a technique that make possible a more detailed statement of the hypothesis at this point, and hold also a suggestion for the elaboration of a method of attack. Indeed, it is possible that presently the evolutionary hypothesis will once more serve not only as an explanatory principle accounting for the origin of the race in the biological order, but as a heuristic principle pointing the way to the discovery of the loci in the life of our species at which biologic changes might occur.

A brief analysis of the general method of collating the empirical data in the light of the evolutionary hypothesis will enable one to see in what kind of facts the biologist finds his evidence of evolutionary changes; and then one may be prepared to ask whether there is any evidence for similar changes going on now, or, if not that, to inquire what the possibility is of such *biological* change in the future history of the human species. That the question may then become really quite specific and may not lose itself in vagueness, we must abstract from many of the extraneous items such as 'fitness' and 'progress,' which with the years have more or less closely associated themselves with the conception of evolution not only in the popular mind but sometimes even in the mind of the scientist, and focus attention upon the item of physiological change which the hypothesis predicates as the essential mark of the evolutionary process.¹

¹ Popularization, even by biologists, leads often to an invocation of these notions of 'betterment' and 'progress,'—frankly used as value terms and reminding us of the Spencerian phrase 'survival of the fittest' which the protagonists of the hypothesis traded upon so much, without appearing to

In the comparative study of life-forms there is noted a constant correlation of structures and functions; as the one varies so does the other; the one change implies the other. As we go 'up' the animal scale there was supposed to be an increasing complexity of anatomical structure and an increasing differentiation of physiological function. At a low level we have the amœba whose one cell does everything; at another stage we have the ant, a species that develops special structures in different bodies for performing the different functions.

Another type of development is represented in the vertebrate phylum. In the vertebrates there is not this marked differentiation of the gross structures. Instead, the individual represents, within himself, the possibility of many functions with a wide range of adaptability of the organism for these various functions; for adaptation takes place primarily not by means of the permanent modification of the gross bodily structure that is represented in the different individuals of the ant colony, but by an internal tuning of the organism by way of complex and relatively labile glandular and nervous mechanisms. This makes possible the participation, on the part of the individual, in all the various functions, without the development of elaborate permanent structures. It is this type of development that is represented in man, in whom 'evolution,' in terms of modifications of gross anatomical structures, has apparently come to an end,—having been replaced by a variable internal mechanism and by the cultural development of tools and technical processes.

With the appearance of man the process of development of gross anatomical structures which the biologist studies and which constitute the basis of his comparisons, is apparently in abeyance; and again with the appearance

note that these were just as unscientific as were some of the old theological conceptions they were to replace.

of man the process of the differentiation of function—of the ways of doing things by means of highly differentiated gross structures such as are laid down in the anatomy of the ant—apparently also ceases. And since it is in terms of modifications of these heritable structures and functions that the biologist has been stating his problem, the appearance of man—a species which replaces its lacking anatomical structures by machines and develops technical processes passed on to the individual by culture rather than by physiological heredity—seemed to justify the conception that biological evolution has come to a standstill, at least so far as significant physiological modifications are concerned that might constitute a variation in species.

Such is the outcome of the application of the current biological method to the problem of man's relation to the evolutionary process.

At first blush the case for what we would term Biologic Finalism seems clear. The 'Evolutionary Process'—which, we sometimes suspect, is often dinosauiromorphized in our thinking as an irresistible, on-rushing 'life-force,' partaking, in addition, of the character of gigantic creatures that once sailed through the air—appears to have slowed down a bit and to have been brought at last under control.

New bodily processes and structures for doing things need no longer be evolved in our anatomical persons,—the species employs mechanical substitutes thought out by the inventor and manufactured in the machine-shop. Do we need paper? No call to manufacture it by an internal physiological process like that of the wasps. Do we need walls of brick and mortar? No call to develop a physiological regurgitating process like that of the termites of Africa, which thus produce their elaborate fortress-walls that rival the walls of Babylon on a small

scale. Man has a labile nervous system and a prehensile hand, which, augmented by tools, can be turned to many and constantly varied tasks, so that the function of blacksmith and of bookkeeper, of soldier and priest, may be subserved at different times by the same individual, even without any marked differentiation of anatomical structures, either temporary, as the ant's wings in the mating season, or permanent, as the weapons of fighting termites.

The notion that biological evolution is now suspended in man could gain ground because in the development of species we have looked primarily for possible structural modifications of sensory or motor equipment. For indeed, the history of species upon the planet has been most dramatically developed about these points. These are not, however, the only points, nor, indeed, the most significant, at which biologic evolution has occurred. It is rather in the *internal*, visceral, processes, with their corresponding structures, that the factors inducing significant changes in the biological organism are to be sought,—for in that internal physiological laboratory not only such items as skin pigmentation, bony growth, and precipitation of adipose layers, are determined, but also such items as the production of adrenalin and the other internal secretions, and of toxic and antitoxic substances as well,—all of which affect the behavior and with it the mental life of the individual in specific ways.

It is these internal chemical processes that constitute the key to such variations in structure as the seasonal growth of antlers in the stag and the changes in glossiness and growth of the hairy coat,—and, as was already indicated by Brown-Séquard, the pioneer investigator in the field of internal secretions, these visceral processes affect, in specific ways, metabolism in the various bodily structures and in the nervous system as well. Though much of the contemporary exploitation of the basic fact that

beauty and strength of body are matters of cell-metabolism—depending on glandular functions which apparently may be controlled by surgical means—will constitute part of a strange chapter in the history of our present civilization, it yet serves to indicate that here humanity is seeking, albeit blindly, in the direction of these internal processes, if not for the secret of evolution, at least for some sort of salvation from its physiological ills. For while it is open to question whether surgical violation of the organism will constitute a short-cut to physiological ‘normalcy’ of these glandular functions, to say nothing of the hope of its being a short-cut to physiological superiority, the basic facts concerning these glandular processes, and the implications of these facts, are significantly brought to the fore by these methods and by the expectations of some of those who resort to them.

All of these internal physiological processes have a long biologic history, and the evolution of these, rather than of genera and species, is in many ways the more profitable study. For it is these endocrine functions that largely determine species in their anatomical organization and in their behavior,² and it is latterly becoming apparent also that they in some way participate in the selection, if not in the determination, of the heritable characteristics and tendencies.

To illustrate from the life of the bee. It is known that a larva transferred from a small ‘worker-cell’ to a larger cell and fed substances differing from those given to the worker-young, develops into a queen-bee instead of a worker. This is an example of the specific effect of the chemical food-substance in determining the growth of anatomical structures and the development of physiologi-

² *Vide* Child, C. M.: *Physiological Foundations of Behavior*, New York, 1925; also Herrick, C. J.: *Neurological Foundations of Behavior*, New York, 1925.

cal functions in the directions characteristic of the queen rather than of the worker. The example of the bee, remote though it is from the life of the human species, serves well to illustrate a parallel, though more complex process, that is similarly basic to the selection, growth, and development of bodily processes and behavior in man. Such substances may be received also into the human body from without as is the case with the many preparations which, like sheep-thyroid, are often prescribed in modern medicine to correct organic functioning.

What is more significant, however, is the internal production of such substances on the part of the organism itself, and their reflex effect upon bodily growth and behavior when these products are released into the system by way of the blood-stream. Here is the ground for the modification of the emotional life and of behavior-tendencies that are at the root of human character,—and here is, in part, also the physiological basis for possible change that might constitute further biological evolution.

It is at the point of these processes that the problems of the race—economic, social, moral, and religious—have a common locus in so far as all of these problems affect man emotionally. If such problems, insistent and deep-moving and universal as they are, present in any sense the conditions under which the human species might possibly evolve in a biological sense, it might be at this common locus. For it is these internal physiological processes that are directly affected in that they are placed and kept in a certain state of instability under the stress of the economic and social situations in man's present stage of civilization,—to the emotional strain of which science attributes many new physiological disorders and on account of which some of our leaders grow apprehensive concerning the future health of the entire species.

Without sharing any such anxiety, we would here cite

it only for purposes of elucidation as to what it is that is unstable and labile both in the individual and in the race, and is therefore a point at which one might look, if one were so minded, for physiological changes that might constitute evolution in the biological sense. Such apprehension, sometimes expressed by medical writers, may be basically determined by a really critical economic and political situation in the world of today, making excessive demands upon 'civilized nerves'; and if it is thus founded, then the world-situation would represent biologically an environmental or *ecological* factor which might operate in the human world after the same manner as far-reaching ecological modifications, such as climatic and geologic changes, have always operated in the biologic order,—*viz.*: by inducing a radical, physiological adjustment. So, too, the strained conditions of the modern human world, with all its economic uncertainty, its 'unrest,' its vague apprehension of cultural cataclysms and its vague sense of moving toward an abyss of terrible racial wars, world-embracing,—these would operate now as the great geologic changes operated in the past upon the living organisms on the earth. The call upon living forms then was to adjust to the physical environment; the call now is to adjust to a world of excited, strained, suspicion-ridden human culture, to values and ideas grounded in conflicting impulses, desires, and needs, and to those mechanisms of social control that derive their power from the individual's dependence upon economic and social relations that ramify so as to include every member of the race.

Yet, curiously enough, contemporary Naturalism does not always aggressively envisage man's place in the biologic order in the light of such considerations; there is a tendency rather to accept the doctrine of Biologic Finalism, and to ignore the implication of the central hypothesis—the implication that the life-processes continue under

the need of constant adjustment to an ever-changing environment.

Whether or not the analysis of contemporary human society just presented reveals an outstanding ecological factor that may become operative in inducing a biological adjustment in the species, it remains true that the hypothesis of biological evolution implies (i) the continued operation of such factors and (ii) physiological modifications of the organism as adjustments to them. Not a new ice age, or the loss of oxygen, or the decrease of heat from the sun, or the exhaustion of the oil supply is the real concern of the species, but rather such items as those outlined, often only reluctantly confessed yet potently affecting the individual's life at every instant of his days. The situation will hardly be met by social and economic reforms, or by the invention and general introduction of new machinery, or by the simple device of ingesting more vitamins, though the latter recommendation does point more nearly in a promising direction. The adjustment which the ecological factor demands is an internal, physiological one.

If such a situation becomes really an ecological crisis, there are indications that successful physiological adjustment to it would be in terms of the very organic processes that now are disturbed and twisted or set for the production of autotoxic substances that ultimately destroy the human organism.

Such an adjustment would be less dramatic than the development of new sense-organs, but it is more consonant with the deeper insight into biological, physiological, and psychological processes that has been gained since Tyndall's day. Tyndall spoke out of an interest in *knowing* the universe when he wrote that "a time may therefore come when this ultra-scientific region by which we are now enfolded may offer itself to terrestrial if not to

human investigation. Two-thirds of the rays emitted by the sun fail to arouse in the eye the sense of vision. The rays exist, but the visual organ requisite for their translation into light does not exist. And so, from this region of darkness and mystery which surrounds us, rays may now be darting which require but the development of the proper intellectual organs to translate them into knowledge as far surpassing ours as ours surpasses that of the wallowing reptiles which once held possession of the planet.’³

Tyndall was still under the influence of that tremendous access of faith and freedom that came with the new Naturalism, and capable of philosophic flights to which now not even our contemporary romancers aspire. Yet one wonders whether those unapprehended items of our physical environment mentioned by Tyndall could constitute a sufficiently potent ecological factor for inducing a physiological adjustment of the human organism to them, and the consideration may quite relevantly interpose itself: whether a physiological adjustment to such rays would take the path of the development of a new sense-organ that would open those rays up to our direct apprehension. Roentgen rays, for instance, do act in specific physiological ways upon our human organism, and the tissues respond to the rays’ action also in specific ways—yet this reaction is *not* in the direction of the development that Tyndall anticipates, namely, of the body’s sense-organ equipment by means of which the organism receives its knowledge of the environing world. We are here reminded of Aristotle’s doctrine of desire and function as the determiners of structures. The ‘organ’ of which Tyndall speaks might develop, from the point of view of Aristotle’s hypothesis, if the scientist desired to sense these rays directly. Since, however, the scientist is

³ Tyndall, John: *Fragments of Science*, New York, 1871, pp. 107-122.

not physiologically keyed by that desire—being actually occupied in establishing the fact of the existence of such rays from an empirical study of their present effects upon the tissues of the human body—it is not likely that a new sensory organ would develop within himself. In a sense Tyndall's hypothesis concerning a possible development of new sensory structures might be expected to be realized rather under the influence of some vague, yet consuming, desire to know directly, as it were, the region of the rays to which Tyndall refers as being beyond the reach of our present senses.

It is not, however, with respect to some inadequacy of sensory or of motor equipment that the ecological situation is making itself felt; and hence one would not expect significant changes in these structures, but rather one would incline to look for modifications at the point of those internal physiological processes that are involved in the sustained emotional strain which some of our medical writers tell us threatens to wear out the civilized races of mankind.

It is for the future to determine the specific nature of the reorganization of the physiological processes involved in the life of feeling, emotion, and mood, of desire and striving, and the psychological character of new qualities or modes of experience that might emerge; also there would arise the question whether this development would be a matter of physiological heredity or primarily a matter of individual acquirement on the basis of a heritable predisposition, such as is the case with the faculty of speech.

This much, however, is clear: that even now we have some knowledge both on the side of mental processes and on the side of bodily processes that indicates that this interior life of the psychophysical organism—the life that is the source of our values and desires and aims and pur-

poses, and which also perhaps plays a part in the determination of our vision and our insight—is far richer than has been commonly supposed; that it is in changes with respect to these, dependent as they are upon the interplay of underlying organic processes constituting an intra-individual environment for one another, that there may emerge, at times, constellations of organic functioning which give us not only the many interesting psychopathological patterns of personality and character, but also, here and there, faint indications of possibilities in the way of psychophysiological functioning that make intelligible to us, albeit in a very limited and partial manner, what may be the nature of that transformation which is hypothecated in all those visions of a transcendent humanity which have enlisted the admiration and sometimes energized the will and stirred strange strivings in the heart of man; and that it is from these wells of personality and character that we may expect—with every reservation for the exclusion, from the hypothesis, of the supernatural and the miraculous,⁴ and with all due regard to the ‘limits’ set, by the nature of the organism, to the possible range of variation⁵—the issue of that changed

⁴ Even when stripped of such miraculous elements as the telepathic and teleplastic powers sometimes attributed to characters like those presented to us in the persons of the Buddha and the Christ, they still imply unusual modes of psychophysiological functioning, whose partial and sporadic realization in human lives may serve to feed that hope and aspiration that, on the basis of purely physiological considerations, constitute, not a guarantee to be sure, but a favorable condition perhaps for the more complete realization. The Pauline distinction between the “natural” life and the “life in Christ,” and the hypothesis of a possible passage from the one to the other, are not entirely without warrant on physiological grounds.

⁵ There is here no tacit commitment, *pro* or *con*, with reference to a neo-Lamarckian position on the question of inheritance, for these modifications may be understood as organic changes conditioned by the intra-individual environment. This notwithstanding, it may also be said that the records of experience constituting the annals of the ‘life of sanctity,’ so-called, are rich in indications bearing on the conception of the genetic process, that reveal a subtler insight into the significance of the process than is sometimes displayed by the contemporary protagonists of the eugenist movement.

humanity that Tyndall anticipated when he whimsically remarked that it is a long way from the iguanodon to the president and gentlemen of the British Association, and assured them that it would be unwarranted to assume that present man ends the series.⁶

And so, while it appears that modern Naturalism—by reason of its empirical method and its formulation of the evolutionary conception in a way that frees that conception from philosophic vagueness and makes it available as a heuristic principle—holds promise of throwing a measure of light not only on man's origin but on his psychophysiological destiny as well, it is clear also that it will not realize this promise so long as it neglects the implications of its central hypothesis that have here been called to mind.

⁶ *Fragments of Science*, New York, 1871, pp. 107-122.

X.

THE PHYSIOLOGICAL DETERMINATION OF CULTURE EPOCHS

IN neglecting these implications of the evolutionary hypothesis with respect to the physiological destiny of man, present-day Naturalism is tending in the same general direction as those other naturalisms which appeared in the culmination of other culture epochs, in Rome and Greece, on the Nile, and in ancient Chinese empires of long ago.¹

Always Naturalism is the viewpoint of enlightened ages; hence the outlook of Trajan and Marcus Aurelius, the best fruits of the closing Roman epoch, is more akin to our own, as Matthew Arnold points out,² than is that of the age of mediæval Catholicism—a stage in our epoch of Western European culture. The enlightened ages that appear as culminations of the great epochs of history have this in common, that much of the verve of primitive faith disappears with the accumulation of experience and the development of the critical attitude. In that Roman day we have the figure of Marcus Aurelius, enlightened and melancholy, loyal with a fine loyalty to his rational ideals, and strong with the strength that few men attain to and that hardly. And alongside the Emperor we have the simple-minded, soul-intoxicated Christians going to a martyr's death with hymns on their lips.—Today we have the disillusioned rationalist, putting his enlightened though temperate trust in the naturalistic method, and alongside him some of the common people espousing curious recrudescences of primitive belief more or less alien to our dominant naturalistic attitude,—a phenomenon

¹ Cf. Petrie, W. M. F.: *The Revolutions of Civilizations*, London, 1911.

² Arnold, Matthew: *Essays in Criticism*, Chapter X.

leading to apprehension in many quarters. The parallel between the conditions prevailing in the Roman enlightenment and those of our own time is a striking one.

This significant parallel between the late Roman and the contemporary civilization is familiar enough; not so, however, certain equally significant differences in outlook characteristic of the various periods within our own epoch, namely that of Western European culture since the days of the Roman decline. The careful reader of history will remark at times that, in certain directions, there seems to have been possible, for the human spirit, a greater measure of freedom in the twelfth and thirteenth centuries than in our own. At times those centuries have even issued a challenge and a summons to experimentation in human possibilities. That summons—while it is not unique in the history of human striving or in the history of Aryan civilizations of the West—is nevertheless, in the *manner* of its appeal, individual to that age. Henry Adams, the historian, senses this in his survey of the ecclesiastical art of those days.³ And those who venture into the less traveled by-paths of literature sense in them also, at times, indications of a similar difference between that age and ours in matters of spiritual quests. The *naïveté* and simplicity, then fostered in the historic Church, spared the individual from overmuch intellectual questioning, and for the man of will its dogmatic ideology held implications that made possible the espousal of unusual objectives on the part of some—objectives for which today there may be little room. The dramatic hair-shirt, flagellation-whip, and stone pillow were not always, as the casual reader of history often assumes, the chief means of aggressively seeking that strange ‘salvation’ that was dimly promised somewhere, somehow,—but

³ Adams, Henry: *Letters to a Niece, and Prayer to the Virgin of Chartres*, Boston, 1913.

sometimes, at least, it was sought by way of quiet, dignified living and a form of genuine research in the 'way that is inward' of which the best known though not necessarily profoundest record is laid down in the *Imitatio* of Thomas à Kempis. Or again, deeds of valor and acts of sweet-flowing charity might then be performed by vigorous youths in the hope of earning the recompense of a gracious smile from Our Lady who wears for mantle the sky's virgin blue. In the cultural setting of those days the establishment of this mode of behavior was perhaps not so difficult a thing; and to give one's love to the Queen of Heaven may have appeared then to some young knight the most natural thing in all the world, when neither Freud nor Watson was about to enlighten him on this point.

Today such allegiance becomes already rarer, even in lands where the Old Faith still reigns; and even there such devotion has lost some of the charming youthful spontaneity and quality of naturalness that seem to have graced it in those other days.

The difference between those centuries that built cathedrals and sent men on quixotic quests, and this twentieth century may easily be magnified in the contemporary reaction under some vague sense of loss. But the difference is nevertheless real.* And to the student of human history it betokens repetition of the usual development of the cultural epoch that has reached, as it were, its term.

Again we must guard against overworking the hypothesis of culture epochs. It serves its purpose if it calls the reader's attention to parallel facts. Ours here is an analytic interest and we would fare but poorly in the rôle of prescribing. And if we were to speak now of the situation as if the specific content of the Naturalistic Hypothesis mattered for the outcome of the course of history, we

* Adams, Henry: *Mont Saint Michel and Chartres*, Boston, 1913.

would be forgetting that it is not the idea, the dominant hypothesis, but the direction of will and impulse that finds expression in history and determines at the same time the emphasis upon certain implications that become not always explicit in the conscious life of the times. Thus we saw that the current tacit assumption that biologic evolution has come to its term on this planet in man, is not so much an *idea*, as a biologically determined attitude which operates in maintaining the physiological *status quo* of the species. It is not so much a reasoned consequence following from the palæontological and anthropological data that are invoked to buttress it, but rather an expression of the will of the species which, if we may turn to the vernacular, intends to 'sit tight.' And so, to speak of the contemporary Naturalism as if it were a rationalization of human experience, and point first to certain foibles that have slipped in, like this notion of Biologic Finalism, and then to certain neglected implications, is but a convenient way of referring to the biologic attitudes that are operative in shaping the course of history and does not imply that if one might go about calling the attention of the race to the logical errors and get a verbal acknowledgment of them, the course of human history would be profoundly affected.

For human history is woven not by the logic of 'ideas,' but on the looms of deep-moving appetites and impulses and desires that possess a dialectic of their own.

And for purposes of our analysis it is these motivations and their dialectic that interest us, and so, if we bring in the neglected implications at all it is because they, or rather the attitudes out of which they are precipitated, happen to play a part in the present human situation, when compared with other culture epochs that also culminated in periods whose keynote was the naturalistic attitude.

It was elsewhere pointed out that in the biologic realm the characters of species reappear in successive life-cycles. But also it is to be noted that new species arise. And the possible parallel to human culture epochs presents itself. Each of these epochs of human history tends to repeat the same general character, such as the sequence of dominant attitudes. It was this that justified the conception of the culture epoch. But we ventured the hypothesis that as in the biologic realm there arise variations in species, so, possibly, in the crisis-situations in human history there may be present the factors that might release a new humanity whose character might deviate in some significant respect from that configuration of characteristics which has found repeated expression in the typical pattern of culture epochs whose course was outlined. And should the crisis-situation call out such a variant from the characteristic attitude, it would find expression in a historic cycle that would be different from the typical pattern which history has so far repeatedly given us.⁵

Now it is here not a matter of expecting that such a change *will* occur, but a matter of analyzing from the viewpoint of social psychology the psychophysiological mechanisms that are involved, so that we may be in a position to understand the situation in terms of the interrelation, or dialectic, of the fundamental action-tendencies.

And it is thus we observe that Henry Adams and others note the twentieth century to be lacking in a certain quality of spiritual *élan* that, it seems, was the possession of the twelfth and thirteenth centuries, which have left behind monuments wakening in us a peculiar sense of loss. And again, we note in such works as the young Mr. Balfour's *Foundations of Belief* a gesture to prevent still

⁵ *Vide supra*, pp. 9-13.

further loss of this same thing,—indeed it is a gesture of warding off the *aboulia* or willessness that has tended, sooner or later, always to settle down upon the naturalistic ages in the various culture epochs of history. We note how Mr. Huxley feared the paralysis of human energies that comes in the wake of ‘systematic materialism’; and how Sir Michael Foster, in the heyday of the youth of our modern Naturalism, bore witness to the repeated utterances of the loss of hope in the future of mankind, as being a ‘sign of the times.’ . . . And finally in our own day we note that the things which these foresaw have apparently come upon our contemporary world in yet fuller measure.

Here are indications that, like other naturalistic periods in human history, ours also has tended to close the door upon humanity’s quest ‘beyond man,’—and no doubt these other periods also had their prophets foretelling the doom of the larger human hopefulness. Yet at the beginning of the naturalistic period or age in which a culture epoch culminates, this trend is not always apparent. The initial attitude is rather one of admiration and exultation over man’s achievements in the developmental scheme. Attention is primarily to the past, to origins, and with it goes a certain pride as the story of man’s growth is envisaged.

Witness Æschylus:

. . . first beholding, they beheld in vain,
And hearing, heard not . . .

.

Nor knew to build a house against the sun
With wickered sides, nor any woodcraft knew,
But lived, like silly ants, beneath the ground
In hollow caves unsunned. There came to them
No steadfast sign of winter, nor of spring
Flower-perfumed, nor of summer full of fruit,

But blindly and lawlessly they did all things,
 Until I taught them how the stars do rise
 And set in mystery, and devised for them
 Number, the inducer of philosophies,
 The synthesis of Letters, and, beside,
 The artificer of all things, Memory,
 That sweet Muse-mother.⁶

Similarly, in Roman days, Lucretius, thanking the Hel-
 lenic spirit for the light it shed on origins, exclaims:

O Glory of the Greeks! who first did chase
 The mind's dread darkness with celestial day,
 The worth illustrating of human life—
 Thee, glad, I follow—

.

For as the doctrines of thy godlike mind
 Prove into birth how nature first uprose,
 All terrors vanish; the blue walls of heaven
 Fly instant—and the boundless void throughout
 Teems with created things.⁷

And Horace, already more sophisticated, points to the
 naturalistic origins of human culture and proposes the
 utilitarian hypothesis of a naturalistic ethics—reminding
 one of Hobbes and of Mandeville, the author of *The Fable
 of the Bees*, of our own era.

When men first crept from out Earth's womb like worms,
 Dumb speechless creatures, with scarce human forms,
 With nails or doubled fists they used to fight
 For acorns or for sleeping-holes at night;
 Clubs followed next; at last to arms they came,

⁶ Browning, Elizabeth B.: *Æschylus, Prometheus Bound*, Poetical Works.
 London, 1906, pp. 148-149.

⁷ Introduction to Book iii of the *De Rerum Natura*; translation by J. M.
 Good, in Bohn's Classical Library, London, 1890.

Which growing practice taught them how to frame,
 Till words and names were found wherewith to mould
 The sounds they uttered, and their thoughts unfold;
 Thenceforth they left off fighting, and began
 To build them cities, guarding man from man,
 And set up laws as barriers against strife
 That threatened person, property or wife.
 'Twas fear of wrong gave birth to right, you'll find,
 If you but search the records of mankind.
 Nature knows good and evil, joy and grief,
 But just and unjust are beyond her brief.^s

In content, these ancient Hellenic and Roman Naturalisms differ not so very much from that of our own epoch. And as regards the elements that enter into the attitude which comes to be sustained in this outlook, the Hellenic, the Roman and our own are also strikingly similar. There is always that sense of freedom, as when Lucretius acknowledges, "All terrors vanish," that delight in the intellectual grasp that the hypothesis gives of origins, and that same exultation in the discovery of the biological foundations of human conduct, that bone of contention between those who seek the ethical sanctions in a naturalistic or in some transcendental order. In fine, the attitude throughout is one of delight at coming into a heritage of intellectual and moral freedom,—as is becoming upon attaining one's majority in the universe. Also attention is occupied throughout, at first, at least, with the origin of man and with the light that it sheds on the origins of morals. And that the spirit of the times following close upon the first flush of Promethean freedom is also very similar in the three, we have already had occasion to remark.

But while there are these similarities, there are also

^s Conington, J. (transl.): *The Satires, Epistles, and Ars Poetica of Horace*, London, 1904, pp. 29 f.

points of difference between those ancient Naturalisms and our own. Of these differences, one, and that a difference of content, stands out for our notice: in those older envisagements of the development of man there was no clear distinction between *cultural* and *physiological* change. It was a certain insight into cultural evolution that speculations and empirical data such as Aristotle's made possible. The effect of this conception, as it filtered into the *Zeitgeist*, was very probably in the direction of weakening the ancient transcendental sanctions that had previously buttressed the moral code. And this weakening may truly have been operative in hastening the 'decline' both of the people and of the ruling class. There developed from it nothing that fed the sentiment of hope or fostered a forward-looking attitude in mankind at large, —even though it did give us one man: Marcus Aurelius.

Our own contemporary Naturalism is somewhat different—as to content at least. Its wider outlook specifically takes in the continuity of evolution from the lower forms of animal life; there are anthropological data bearing directly upon the changes in man's bodily structure; the contemporary hypothesis, we recalled, has a distinctly physiological slant, and, furthermore, looks definitely toward the future, as well as to the past.

In these respects our Naturalism is richer than that of our predecessors of the ages of the Ptolemies and the Antonines. Comparison, particularly with the latter of these periods, invites reflection. Without indulging in elaboration, we would here point to the possibility that the appeal of Mithras and of early Christianity derived from the fact that they supplied what the Naturalism of the day lacked. That appeal resided not alone in their 'otherworldliness,' but, in part, in their intimation of some sort of bodily change that conditioned the spiritual change that was sought. It is significant that our later

Western civilization has tended to evade this Christian doctrine of a body that is to be cleansed and purified as a condition for receiving the proffered grace. Yet there is no ambiguity about the meaning of Saint Paul's distinction between 'sins' against the body and those outside the body, and there is no doubt left in the mind as to which of these sins is the more disastrous so far as the attainment of 'salvation' is concerned. It was this doctrine with its distinctly physiological slant that, divested of its Pauline acerbity, continued later in the West to hold the imagination of the people in such legends as those of Percival and Lancelot, Galahad and Saint George, and, thus transfigured, it continued to command at least the respect and admiration, and at times the allegiance of the people of our epoch until the Renaissance. And this doctrine, which was destined to give to the twelfth and thirteenth centuries that flavor of spiritual freedom and adventure that we may still sense in their art, in their legends, and in the stories of their saints and also of their less saintly, was precipitated upon the Mediterranean world in that weary Roman day; where all about were tired, it came with its challenge of experimentation. This teaching was not, as so many latter-day writers would have us believe, primarily concerned with the social order. "That which is Cæsar's," yes; then the advice: "study to be quiet, and to do your own business, and to work with your own hands";⁹ beyond that it counseled complete absorption in the quest. It was not dogmatic. The method it proposed was curiously in accord with the best scientific procedure. He that "doeth the will," he that follows instructions as to action, shall discover the "doctrine." No wonder that in that day it sometimes fired the will and fed, perhaps, the minds and hearts of common men, while all about them was, at best, disillusionment and melancholy.

⁹ I Thessalonians iv, 11.

At any rate, we may note that while the Naturalism of that Roman day succeeded in loosing the hold of transcendental sanctions by giving an insight into the natural growth of culture in customs and moralities, it developed within the sphere of its ideology no conception that might serve for the attachment of the attitude of forward-looking, of hope and faith. It was the lack of some such element in the Naturalism of that day that was in part responsible for the turning to Christianity on the part of many. And in this respect, we said, our own Naturalism is richer. And yet our age has not 'realized' upon this asset. Its central conception, curiously enough, might well have served after the manner in which that early Christianity served at the point where the ancient Naturalism failed; for our central hypothesis of evolution has by implication that same forward reference that early Christianity had, and it might have functioned like the latter, as a heuristic principle, and invited humanity to a quest beyond man. And furthermore it might have developed that conception of organic change which is implicit in all of early Christianity's emphasis upon the body—apparent not only in the aberrations to which it led through the early centuries, but also in its positive achievements, rumors and memories of which still abide with us.

But the possibility of organic modification, implied in our contemporary doctrine of biological evolution, has not, in any vital way, affected the will, nor has it even been envisaged intellectually in a manner to affect the outlook of the age. And some of the contemporary efforts to induct the people into the kingdom of science savor of the clinching of Naturalism as a dogma rather than of the process of imparting that spirit of enterprise, of search, of quest, out of which all living knowledge grows. For in one sense our contemporary Naturalism, though committed 'in principle' to the method of empirical re-

search, has rather sapped the initiative of the age,—which has become an age of scientific specialists upon whose *dicta* the people wait as upon a new source of revelation.

Human history, then, is not a matter of chance. So long as man is what he is, as a species, we may expect this repetition of the rise and fall of successive civilizations in which the external details repeat themselves with a certain monotony. It is not, however, these constant items that are the most significant, but rather the points at which variations occur, as, for instance, such points at which the Naturalism of our age differs from its predecessors of other culture epochs. But such points in the development of our contemporary Western civilization, at which potentially a direction might be given to the present epoch that might make its course a variant,—the parallel to the event of the rise of a new species in biological development—have not exhibited any marked tendency to make themselves felt in the unfolding of our present epoch. The fact that the evolutionary hypothesis has a forward reference, looking toward a further biological development upon the planet,—a development that involves, by implication, the possibility of a physiological change in man himself with respect to his capacities—has not in any marked way influenced the outlook of the men and women of our age;¹⁰ nor has the fact that Naturalism's method is essentially that of experiment and search had a patent effect upon the general behavior of man.

It is these two things that were absent in the naturalistic outlook of the day of Marcus Aurelius, marking the

¹⁰ At most, and that rarely, there is expressed a somewhat general caution not to conclude too hastily that further evolution of intrinsic human capacities is impossible or improbable. Thus J. R. Angell says he "cannot altogether sympathize with the somewhat definite negative opinion occasionally advanced on the point." (*Evolution of Man*, ed. by G. A. Batsell, New Haven, 1922, pp. 122 ff.)

culmination of the Roman epoch. Our own epoch, on the other hand, it was thought, might develop these saving items from within itself by reason of a more clear-cut hypothesis and a well-defined method. Those other epochs seem indeed to have failed, in part at least, because they did not achieve so conscious a realization of the full scope of empiricism. But that realization is still weak also among us and therefore our own age may fail, perhaps, to supply the things whose lack has created apprehension in many of the more thoughtful of our own day. The enthusiasm of later nineteenth-century Naturalism did not spread to the people; and even leaders like Huxley gave evidence of a certain timidity in working out its implications for human life.

In fine, our contemporary Naturalism has not yet given that scientific outlook upon the future nor has it kindled that saving fire of eager quest in our modern world,—even though both these possibilities were peculiarly inherent in it.

To the observer it is not an occasion for impatience, or even for regret, but rather an opportunity for gaining an understanding of the factors that make human history.

The course of history as laid down in these successive culture epochs is seen to be determined ultimately by human nature. The problems which an age may 'feel' have their ground within ourselves; and when we note that the various ages or periods fall into a typical pattern within the larger cultural epoch or cycle, we know that the basis for the sameness of that pattern rests ultimately, to be sure not in the external constellations of the heavens of the ancients, but in the configuration of the organic processes in man himself,—configurations that are determined by the operation of natural law.

XI.

THE PHYSIOLOGICAL SIGNIFICANCE OF CRISES IN HUMAN HISTORY

WHEN human history is seen to be the record of the operation of the physiological determining tendencies, organized into patterns that follow upon one another after a manner somewhat like that of the changes in physiological set that are observable in the individual life-cycle from infancy, through childhood, adolescence, maturity, and old age, then the crisis-situations of history take on a new significance in that they, too, will be seen in the light of the psychophysiological organization or tuning which they call out in the humanity affected by them.

One of our generals has recently intimated that the next war will be decided virtually by the amount of fearless self-effacement, with no chance of life, that can be released in the belligerent nations. The side that possesses most of this will conquer.

Clearly, the general is speaking not in terms of armaments, nor in terms of the possibility of mobilizing the money and labor of a nation in addition to man power, nor of the possibility of bringing to bear upon the individual at the front and at home the force of public opinion to insure 'delivery' in the way of service, in terms either of possessions or of life-blood. Nor is it a matter even of native, unreflective aggressiveness that is based upon the fundamental physiological keying to be found in the angry animal and in an organism possessing an abundance of energy, as a tendency toward adventurous and lusty action. Such aggressiveness has been the basis of the conquest of wildernesses on the part of the early human hordes. And it has been the physiological basis also for

the warrior-ideal of the stage of predatory culture, about which there developed the institutes of chivalry, which functioned not so much as 'checks' upon the original combative tendencies, but as an elaboration of them into an art of human conduct.

Whether or not the industrial age with its naturalistic outlook still holds within itself the conditions for fostering the attitudes out of which that chivalry grew, is not even a relevant question here. For while there is no doubt that the peoples who developed the institutes of chivalry as refinements of the basic predatory culture of the early centuries of our Western European epoch, still possess, in our own age, that heritage of good sportsmanship that is, after all, the heart of chivalry,—it is not these attitudes and sentiments that appear as the *sine qua non* in the world-wide conflicts that some anticipate in the near future. It is not the primitive desire and readiness to enter a fight with the chances matched for coming out victorious over an opponent whose prowess and skill is acknowledged and admired—our heritage from the days of chivalry—that will count. What is requisite is something in the way of attitudes that make for readiness to go to certain death, with no chance of life, unaccompanied and without the sportsman's joy of direct personal contact with an adversary. Voluntary self-effacement. . . .

Vaguely it is felt that here, at the point of attitudes, is the real test, not only of the military forces in the field but ultimately of the conflicting peoples: the acquisition of attitudes that, unlike those of the ancient chivalry of the Western Aryan, are built not simply upon the fundamental aggressive tendencies but upon a *calm espousal of death*, with all the organic reflexes belonging to the reaction against such an espousal, completely under control. Here one may sense something not only foreign to the

contemporary naturalistic viewpoint, but quite foreign to our Western Aryan temper. . . .

Yet how is it foreign? we may ask.

While the restless Aryan brought forth in the West the Persian, the Hellenic, the Roman, the Celtic, the Slavic, and the Teutonic civilizations, of whose outward mark of push and drive we are so proud, that same restlessness of his led him in the East on a quest that resulted in a product which, even to the mere outward observation of those of the West who cannot understand it, has upon it the mark of tremendous and zealous labor. As one may sense the spirit in which another does his work without understanding it, so we can sense in this product of our Hindu cousins that same unremitting endeavor; and this leads us to the judgment that these brother Aryans have not been otherwise than diligent since they parted company with us some forty or forty-five centuries ago. All the ancient Aryan courage is there, undiminished, expressed, perhaps, in a different way. As the Western Aryan has explored the outward world, so his brother of the East may have explored the inward paths which lead, so he believes, into the spirit and heart of man;—and though the ways of the Eastern Aryan are not as ours, we may yet be able to see that in them he has acquired a certain mastery all his own.

In him the restless Aryan will, by arduous training, has produced one “who can wait a thousand years.” None but they who know only too well this restless Aryan spirit could frame the precept to hold in leash the associative processes in thought and imagination: “Make thy mind as a quiet pool in the moonlight.” . . .

By labor of the will these Aryan cousins of ours have achieved that which would make a people invincible, should they choose to fight after their own manner. They have learned, it seems, to look in a curious way beyond

the individual life, and, if need be, beyond pleasure and pain, in a way that we of the West can but dimly understand. But this we are beginning to see: that this transcending of the individual self is an achievement of the Aryan will.

And in Buddhism they once clinched, as it were, this Aryan achievement.

Buddhism no longer flourishes in its Aryan birthplace, but has been taken over by a non-Aryan people who already possess, perhaps, not as an acquisition but as a native endowment, that calm which our Aryan cousin could arrive at only by a strenuous path. Thus the Aryan made articulate for these non-Aryan peoples their native bent and reinforced and made a conscious ideal of what was perhaps already theirs as a matter of native temperament and 'original' physiological predisposition. And taking over this gift, these non-Aryan peoples perfected it in the direction of their own native bent. They developed no labored formulæ for the subjugation of a recalcitrant individual will, but produced an artistic image which, with an almost terrible economy of line,¹ reveals the attitude in which man or god becomes invincible.

The images of the Buddhas, Kwanons, and Boddhisattvas of ancient China and of old Japan bear witness to the manner in which the native bent and the inherent source of power of these non-Aryans was illumined for them by their Aryan neighbor to the south; and also they bear witness to the manner in which these non-Aryans developed a technique for its further accentuation.² This non-Aryan technique, simply and effectively, without words and with-

¹ Inasmuch as we are noting the *Aryan* influences in the cultural fixation of the attitudes involved in this Oriental ideal of character, we would here call attention, in passing, also to the evidence of a subtle influence of the Greek culture upon that of ancient China and Japan.

² *Vide* Fenollosa, E. F.: *Epochs of Chinese and Japanese Art*, London, 1912.

out hubbub silently sustains an august image in the mind of the people and thereby clinches the essential attitude in their very vitals and therein gives that subtle training in that quiet beauty and strength which we of the West sense vaguely and comprehend hardly. . . . Such is the attitude, it seems, that our general dimly apprehends as the test of future conflicts when we are told in the vernacular that it is not armaments but 'guts'—and if we follow the general, even a peculiarly different and rare species of that commodity—that will be the deciding factor, should a conflict arise.

At this point a relevant psychophysiological consideration interposes itself. There is a distinction between such affective states as anger, in which there is a sudden *temporary* access of energy to the muscles, and others in which there may be a more even and *sustained* access and expenditure over a long period of time.³ The physiological mechanisms for these two kinds of states are distinctly different; in the economy of the organism they represent the difference between *mobilization* of the available supply of energy and continuous efficient high-level *production*. The energy-release in anger is different from that occurring in the mother who works all day in the canning factory and watches all night at the bedside of her sick child, for many weeks, without sleep and yet without any visible signs of breakdown. Physiologically, her organism has a characteristic tuning, different from that in which energies are being primarily mobilized for sudden action.

Here there exists a difference in bodily states that may eventually throw some light on that subtle but real difference between the Occidental peoples and the peoples of Asia, both Aryan and non-Aryan. And here there may

³ *Vide* Cannon, W. B.: *Bodily Changes in Pain, Hunger, Fear, and Rage*, New York, 1915.

emerge one of those variations in physiological functioning that may ultimately appear of great significance for humanity in the light of the conception of biological evolution. The hypothesis is not unwarranted that in this underlying mode of organic functioning may reside, in part, that variational slant in physiological adjustment which, we saw, might give to our epoch a direction of cultural development that would make its course different from that typical of the major culture epochs of history when they arrived at the stage of enlightenment, with its naturalistic attitude and the disillusion and 'decline' that appears to set in when this naturalistic attitude becomes dominant.

More specifically, here there may appear an indication of the direction in which there might be a resolution of the biological crisis in the history of the race, which may be seen in the psychophysiological disturbances resulting from the strain that our contemporary culture is putting upon the human nervous system. So far as this initial physiological effect upon civilized humanity may be taken to indicate a crucial ecological situation in a biological sense, the question arises: What may be the possible organic patterning that would effect a resolution of this crisis? And it might be said that a further, and seemingly more important, question that comes up is: How might this adjustment occur? For if we rightly see in the dialectic intrinsic to these basic physiological functions, which is reflected in the changing emphasis on the various attitudes of feeling and volition, a factor that determines the course of human history, we may hope, through understanding this dialectic, to gain some measure of insight into the processes that shall give shape to events in the racial future just ahead of us.

The dialectic of these psychophysiological processes would thus constitute a key to the problems of our con-

temporary civilization. It would, for instance, open up for us a way of understanding, in some measure, the possibility of that world-conflict, that clash of races and cultures, predicted not only by some of our journalists, but also by some of those who speak in the name of science. Whether or not such a conflict is as imminent as is sometimes pictured, it behooves our dignity as individual human beings to make an appraisal of such a possibility in the light of its significance for the future of humanity upon the planet. Whatever the motives leading to conflict, be they racial antagonisms or desire to control the world's oil supply, such conflict may become not only the test of the contemporary Naturalism, but the occasion also for the meeting and the testing of many attitudes; and, from the psychological standpoint, what may ultimately prove most significant may be not the fierce conflict of races, but—in all that medley of races, faiths, and attitudes—the meeting of the Aryan spirit of the West with the Aryan spirit of the East, after forty-odd centuries of growth, each after its own manner. The Aryan of the West has developed to the fullest, as if commissioned thereto, all the outward tools that nature demanded of man when she stripped him not only of the preformed mechanisms of the ant, but also of the strength of the more powerful beasts. The Aryan of the East, having gone another way, may have developed along lines we cannot yet appraise, but whose general direction is indicated for us by recent events in India. The entire *method* of the Aryan of the East is essentially different from that of the Western Aryan, and in it there are intimations of a strange and almost irresistible power—a power that is inward and of the very sort that our general felt would be the deciding factor in a future conflict.

The crises of history and the antecedents that lead up to them may thus be stated in terms of psychophysiologi-

cal processes, and it is then that the data of history cease to constitute merely a record of unusual events and receive incorporation into the body of that science which is the science of man.⁴ Our general, in the illustrative case, was speaking in terms of voluntary inhibition and control of the organic processes that are automatically started in crisis-situations where the organism is facing certain death. Similarly, the underlying general principles of organic determination may furnish the formulæ for the crisis of contemporary civilization—whether it be thought of, as by Huxley, as the danger of a paralysis of healthy forthright action, or as the physiological deterioration of the race under the stress of modern civilization, as do some of our doctors. And likewise it is in terms of these principles of organic determination that possible adjustments to the crisis may be stated.

Such a statement has the advantage of allowing us to leave aside the confusing economic, political, and cultural details entering into a description of the environmental situations that constitute the present crisis, and to characterize it by means of some common physiological mark: namely, that our contemporary civilization has tended to sap the energies of its humanity by making demands upon

⁴ Frederick J. Teggart (*Theory of History*, New Haven, 1925), discussing the methodology of historical study, casts about for a new form of presentation of the materials of historical investigation, in the belief that in confining themselves to the use of the narrative form alone historians "have cut themselves off from any possibility of the attainment of scientific results." He avers that, "pursued in isolation, historical study finds its end in the æsthetic appreciation of unusual happenings, while evolutionary study exhausts itself in the vain quest of processes of change." It is clear, he thinks, that to arrive at a science of man it is necessary to bring into a common focus the study of events and the study of processes. The analysis is keenly made and one truly regrets that Mr. Teggart does not develop fully its implications for the methodology of his field. Now it is precisely the standpoint of the present essay that the *events* of history, when translated into the *processes* of psychology and physiology, become the basis for a scientific study of that human experience and human behavior which constitute the content of civilizations; and that this makes possible the envisagement of the facts of history within the general perspective of natural science.

the individuals so that their organisms are kept for long periods in the catabolic phase; and that it has gotten out of touch with the physiological mechanisms favoring anabolism, the mechanisms that might build up the organism and reënergize it.

In a word, if the age does truly partake of the nature of a physiological crisis, it is because it is sealing the wells of energy that were once released in the attitudes of faith and hope and perhaps of charity, which are essentially anabolic, and is blindly seeking perhaps to stave off disaster by the use of nostrums and by violations of the organism in the false hope that these might constitute not only a way to health, but even a short-cut to the fountain of youth.

XII.

THE PHYSIOLOGICAL SIGNIFICANCE OF THE RELIGIOUS LIFE

IT is such crises as these that bring to a focus the problem of the place of the religious life in the biologic order. We saw, for instance, in envisaging the life of the declining Roman culture from a physiological point of view, that the processes of feeling and action typical of primitive Christianity involve a tuning of the organism which, in a world given to *ennui* and despair, stood out in contrast by reason of its unmistakably anabolic character. Physiologically, Christianity meant in a tired world an access of energy and, indeed, a keying of the bodily functions—as in the emotion of joy, or in the attitudes of expectancy and hope, or in the more sustained tuning of the psychophysiological organism that characterizes the attitude of faith—in which the wells of energy are literally unsealed. Strange though it may sound to our modern ears, it is nevertheless the case that, by implication, the Christian tradition of the early centuries unambiguously counseled a return to a certain biological soundness involving a difficult because radical, but not impossible, reorganization of the physiologic habits of the individual's visceral processes. When this reorganization supervened, it was by reason of an entirely normal functioning of specific physiological processes brought reflexly into play because of the operation of the physiological principle of facilitation through previous inhibition.

While such reorganization is implied in all the so-called 'higher' religious systems,—traces of it being found even in the Nordic tradition preserved in the Eddas—a certain continuity in the tradition received by our Western Euro-

pean civilization from the preceding Mediterranean civilization makes it easier to follow the changing status of the teachings on this point through the Christian centuries. The Eddas, shot through, as they are, with the lusty battle-cries of predatory barbarians, do not, indeed, in their transmitted form, offer great help to us,—much as we might welcome a clearer insight into the beginnings of the Aryan outlook among our Northern forbears. The teachings of the Eastern Aryan, while emphasizing clearly the possibility of such a reorganization of our humanity, are also difficult to understand, though perhaps for another reason. The Christian tradition, on the other hand, whatever its sources—Hebraic, Hellenic, Egyptian, or perhaps Persian even and Far Eastern—has played in the history of our own civilization a rôle not always minor; and so again and again we witness how, through the centuries, our Western humanity acknowledges that it hears, even though perhaps it follows not, the call to ‘regeneration.’ Indeed, no small part of the history of our Western civilization is an account of the manner in which our humanity has reacted to that call. An analysis of that reaction and of the specific interpretations that have been placed upon the call, will bring out certain points vital to the comprehension we are seeking. It may, perhaps, be difficult to refrain from all evaluation at this point, and from allowing some deep-rooted biases, not only cultural but physiological, to make themselves felt. And yet, that is essential for a truly objective comprehension of the religious life in its larger biologic significance.

History allows no ambiguity to attach to the physiological significance of early Christianity’s doctrines as to methods of attaining the proffered grace. It is quite comprehensible that the ‘enlightenment’ beginning with the Renaissance found the doctrine irksome. The open affir-

mation by the Renaissance of the legitimacy and dignity of the 'natural' life is but evidence that up to that time, those coming under the Christian influence felt constrained to subscribe, in principle at least, to the doctrine that the means of 'salvation' lie in part in the 'overcoming of the body' taught by Pauline Christianity. But history makes it unnecessary to rely upon inference on this point. The doctrine, becoming a part of the current culture, necessarily had attached to it all sorts of reactions of the people. It was often misunderstood and then led to curious aberrations in practice. Yet such aberrations, from hair-shirt and excessive fasting to taking up one's abode on top of a pillar, are frequently redeemed from an æsthetic point of view, at least, by their reference to an objective to which attached a certain dignity. The humor, too, that came to the surface of the public mind, such as that concerning the temptations of Saint Anthony, was cast in a mould that reveals often a sportsmanlike 'handling it' to the Saint for his perseverance, and left room for the recognition and sympathetic appreciation of the ideal for which he was striving. But this aspect of the Christian doctrine finds also more positive expression, registered in the many legends cherished in the popular mind, such as those concerning Saint George and Percival and Peredur, the keynote of which is a dignified presentation of the original doctrine that the 'salvation' of mankind will be compassed somehow by its youth who have 'overcome' within themselves the 'curse' that was supposed to rest upon the 'flesh.'

The objective of this program of regeneration is couched as a certain type of human character to be achieved, indicated in the rich heritage in legend and tradition, a character that is master of itself, one that knows inwardly a certain type of keying of the affective processes and of the attitudes that are the matrix out of

which develop the purposes and the outlook of the individual. And the keynote of this tradition is, in brief, the approval of the motive to fare forth on the 'adventure that is in Christ.' It has left us, particularly in the intimations of the *Zeitgeist* of the twelfth and thirteenth centuries, many cultural monuments which reveal a rare toleration for, and understanding of, the Pauline doctrine¹ that the body, presented 'a living sacrifice,' constitutes in part the secret of humanity transfigured.

At any rate, whatever may be our contemporary evaluation of this doctrine, which has played so interesting a part among the factors that have determined the individual character of the civilization called Christian, it is clear that through these many centuries a fairly specific meaning has been consistently attached to it. It signified that in the last resort the implied psychophysiological reorganization might be expected to occur upon the fulfillment of certain disciplinary rules of body and mind, principally upon the assumption of certain attitudes that tend, under the stress of economic and social conditions, to have as a rule little chance of becoming habituated. With the achievement of such a shift or change in *attitudes*, there is accomplished, as we now know, on the bodily side a change in the tuning of visceral organs and nervous system. And if we leave aside for the present the question whether the supervening mental states and accompanying bodily states may be of a variety in any sense different from those which the psychophysical organism usually registers—the evidence is clear that the fundamental attitudes which were emphasized and elicited in the early Christian technique are those that are known to involve the mechanisms that favor physiological anabolism.

Now we have come across intimations that in our own

¹ Romans xii, 1.

age humanity is looking for relief in the direction of endeavors to tap these very organic processes that are involved in the physiological tuning characteristic of the attitudes entering into such 'religious awakening' as that of early Christianity. Contemporary physiology and psychology point to the springs of healing—and we see they are the same as those which opened up spontaneously to a suffering humanity in the early Christian centuries. It is, indeed, not likely that the popular expectation of achieving an abiding physiological rejuvenation by some easy method, such as surgical operation, will be realized, any more than were the hopes of the mediæval prodigal to be restored to the bloom of youth through the alchemists' 'elixir of life.' But while attempts like these to achieve results by such short-cut methods are destined to go down in history as curious cultural aberrations,² they have nevertheless served in that they have facilitated illuminating experimental observation of the marvelous organization of the physiological processes, and more particularly of those processes that are basic to the regeneration of the organism. For the implications of the underlying physiological matter of fact with respect to the organic functions not only furnish a basis for an understanding of man's place in the order of nature, but indicate also a possible direction for human striving. Such is the promise, though as yet unrealized, of our contemporary Naturalism. And the significant thing here is that this promise points to the same springs of healing as does the ancient doctrine. If we leave aside the obvious differences in terminology and manner of statement, both imply that

² The reason for this is that they miss the biologic significance of the organic unity of psychophysiological functioning. Endocrine preparations and surgical operations and radioactive interference with the process of germ-cell production are at best emergency-measures for getting temporary control of the disordered machinery; they are not substitutes for a house physiologically and morally in order.

'physiological transgressions' may become organized into the substance of the 'flesh'; and both imply also that a reconstitution of, and by way of, physiological processes is possible.

From the viewpoint of this parallelism, the phenomena of the religious life come to take on not only a physiological but also a biological significance. For they reveal, first of all, the complex situation confronting the individual in the economic and social life; and what is more, they reveal this economic and social *milieu* to be operative as an ecological factor in the sense in which that conception was developed in an earlier chapter. Secondly, they point to the processes of organic adjustment involved, for instance, in the achievement of just that spontaneous *shift* in normal organic functioning in the direction of heightened anabolism which contemporary medicine seeks to achieve sometimes by mechanical means. And finally, they may, in their implications, indicate possible directions of human development in a psycho-biological sense,—directions which may be intimated, perhaps, in the intuitions, or flashes of insight, the so-called mysteries which are, as Récéjac³ puts it, sometimes cherished of the heart as the "living fire" and "building word." And it is about such intuitions—Récéjac points out in his own way—that there may become organized the attitudes of the occasional individual after a manner which suggests that from such 'experiments' in attitudes might be precipitated, perhaps, new modes of psychophysiological functioning looking toward a changed humanity,—if not the 'Perfect One' then perhaps the humanity that might at least be able to understand, to know, by reason of its partial participation in these psychophysiological attitudes, what that other Humanity that is anticipated, would be like.

³ Récéjac, E.: *Essay on the Bases of the Mystic Knowledge* (trans. by S. C. Upton), New York, 1899, pp. 183 ff.

Historically, then, we discover that the 'religious awakening' is favored particularly at times when the entire configuration of cultural processes is essentially that of ages with the marks of economic, social, and, perhaps, ethnic pressure upon them,—a fact which was pointed to in an earlier chapter. Under such conditions the organic set may sometimes be shifted automatically from that of striving and straining, of anxiety or worry, or some other form of tension set to that of hope and faith, on the basis of the principle of physiological facilitation through previous inhibition. According to this principle, for example, a muscle that has been inhibited from acting by reason of the inhibition exercised by the action of another muscle, is thereby prepared for heightened functioning when the inhibition ceases.⁴ The same principle is operative in organic functions, which also present such antagonistic relationships in which this type of mutual inhibition and facilitation is operative. The release of the up-building physiological functions that may take place in such historic crises as in the early Christian centuries, and perhaps again at the present time, is thus physiologically prepared for. Basic to this religious awakening on the bodily side is a tuning of the organism in favor of the anabolic functions, and the release of these is not at all a matter of chance, but in accord with the operation of known physiological principles. And whereas any procedure which involves a violation of these laws is doomed to failure, a normal shift to this particular set, such as may occur during crises in the life of the individual or, at times, even of the group, represents a case of a healthy functioning of these same physiological processes.

And therein consists the biological significance of the religious life. Whatever else it may mean, it means a

⁴ *Vide* Sherrington, C. S.: *The Integrative Action of the Nervous System*, New York, 1906.

search for, and at times a discovery of, the psychophysiological mechanisms which will function in the resolution of the physiological crises such as we saw are characteristic of ages of enlightenment like our own within the various culture epochs.

An analysis of the religious experience from the point of view of physiological psychology promises therefore not only to give us an understanding of the religious life, but may open up a way of approach to the question of the biologic destiny of humanity, a way of approach which, for some reason or other, is seldom seriously entered upon.

We need not wait for the cultural cataclysms foreboded by those who 'view with alarm' the signs of approaching storms; we turn instead to the records laid down in history, and discover in the extant first-hand documents the items that will throw light upon the mechanisms which we have had occasion to refer to as constitutive of the religious life. The descriptions of recommended procedures that are laid down in the canonical literatures, in manuals, and in the annals of the life of sanctity, as well as in sundry less-traveled by-paths of the literature, legends, and rumors of this quest of man, all indicate that they look toward specific results first of all within the individual experience.

A critical study of the records of this quest in the light of our contemporary knowledge of mental and bodily processes reveals the fact that here the race has come upon and developed something like a technique aiming at a changed humanity, in part through an induced change in bodily functioning. And even where the record is primarily one of joy over the discovery of, or of entry into, the *Vita Nuova*, there is nevertheless a wealth of descriptive references to changed bodily processes that tally with surprising accuracy with the standard accounts of the

bodily accompaniments of the affective processes and of the complex psychological patterns into which these affective processes enter. And what is more, these accounts point often consistently to new patterns of the psychological and physiological processes, or to patterns that are rare,—and thus they may become indicative of possible directions of development.

If a momentary divagation be permitted: the records, the canonical literatures, the traditions, the legends and rumors all teem with statements as to changes in mind and body that seem sometimes to be of a most radical sort, and the opposition that is apparently aroused at times within us against the suggested processes of 're-birth' may have its source partly in a very real though perhaps partial appreciation of the magnitude of the psychophysiological change that is implied. Vague though the objective might appear—and that it has appeared vague there can be no doubt—it nevertheless seems to have made specific demands upon its neophytes, and attempted compliance with these demands brought about often a head-on collision with the entire system of man's impulses, desires, appetites, and emotional and volitional attitudes, concerning whose bodily bases there also can be no doubt. The nature of the opposition of the 'natural man' within us to such reorganization we have already had occasion to refer to in the discussions of Biologic Finalism and the taboo upon knowledge.

But whatever these processes of induction, and however warranted or unwarranted the expected results from such processes, both processes and expectations are evidence of questings in the direction of possible developments beyond the present psychophysiological habitus of the species, a habitus leading periodically in the cycles of history to crisis-situations. This direction is in its general trend entirely consonant with the neglected implications of the

evolutionary hypothesis that were pointed to by Tyndall, *viz.*: that biological evolution is not to be conceived as ending with humanity with its present psychophysiological equipment and organization. In this respect those dedicated to such a quest, no matter in what era or in what stage of culture, would represent cases of the application of the hypothesis of biological evolution as a heuristic principle.

XIII.

THE BIOLOGICAL LOCUS OF THE RELIGIOUS EXPERIENCE

AS in historic epochs the environmental conditions in the economic and social *milieu* develop at certain periods into crisis-situations that are the occasion for some sort of physiological readjustment which is at times achieved by the spontaneous release of the processes of healing—as in the recrudescence of the attitude of faith in early Christianity during the Roman decline,—so, too, in the life of the individual it is often the physiological crisis that becomes the occasion for such a reorganization of the psychophysical organism. And it is no matter for surprise that the relevant studies tend to bear out this point. In attempting to find the locus of religious experience in the individual life-process, the studies of Coe¹ and of Starbuck² reveal the fact of typical changes of mental attitudes accompanying the general psychosomatic development during adolescence. In their more marked form, these changes in attitudes have come to be called ‘conversion’ and have come to be the object of special attention particularly on the part of not a few among American psychologists who have entered upon the study of this field.

We would remark in passing, however, that quite apart from the effect that a special emphasis upon this phenomenon may have had upon the religious life of many of our American communities, it has resulted partly in obscuring the fact that ‘conversion’ is not nearly so common nor always so definite an experience as one might be led to believe. Inge has pointed out that sudden ‘conversion,’

¹ Coe, A. E.: *The Spiritual Life*, New York, 1900.

² Starbuck, E. D.: *The Psychology of Religion*, New York, 1900.

though a fairly common phenomenon, is neither the commonest nor the most regular mode of development in the religious life. He once said: "I know that the valuable researches of Starbuck and others in this country point to a different conclusion; but unless the typical mental and spiritual development in adolescence differs widely on the two sides of the Atlantic, I feel sure that Starbuck's statistics are misleading, being drawn too much from sects which teach sudden conversion, and lead these boys and girls to expect it. In my own experience, I have never come across a case of sudden conversion at all resembling the crisis which the Methodists consider normal." Coe, too, points out that there is a more stable type of man and woman who exhibit many of the characteristic modifications of behavior supposed to follow upon 'conversion,' but who yet cannot report anything marked in the flow of their experience at all resembling that reported by some of their brethren in faith. The sudden 'crisis' which some denominations have held forth as the thing to be expected and have often induced artificially by playing systematically upon the emotional life of youth at 'revivals,' is not necessarily normal for religious experience.

But having pointed out this fact, let us note the further fact that the studies which have made this transformation in the mental life and in behavior their central problem, have located it, when it does occur, primarily at the points in the life-cycle where far-reaching physiological changes are going on, involving a reorganization of the entire system of behavior-tendencies of the individual. Such reorganizations may or may not take the form of a crisis in the individual's experience. When environmental and physiological conditions are favorable, the normal change from one phase of organic functioning to the next may be smooth enough; but when either external or internal factors operate, let us say, in prolonging one phase and

in preventing the occurrence of the next phase, we have one of the conditions that may precipitate the crisis-experience.

If we attempt to determine more specifically the loci in the human life-cycle which constitute more or less definite turning-points in the general mode of response on the part of the individual, we discover two such periods. One of these is adolescence, the other falls in later middle-life.

It is a commonplace that adolescence is a time of tension and of stress, and to many it may appear simply a case of proving the obvious when Starbuck and Coe plot the curves of age-distribution for religious awakenings and discover that these occur most frequently between the ages of twelve and twenty. These studies, however, leave entirely unconsidered another period of the life-cycle, at which, though in a lesser degree, there is frequently an experience having religious significance. This is the period of later middle-life. Contemporary accounts of such changes at this time of life are not wanting; but what the many conditioning factors may be—organic and cultural—remains yet to be determined.

We may say at once, however, that both these periods have demonstrably conditioning factors of a physiological sort. Concerning the adolescent, Ames³ has pointed out that the same impulse which hitherto moved parents and teachers to protect and further the welfare of the youth, “now lives within his own nature, urging him forward to act for himself in the companionship and the social life which love creates.” The entire psychophysical organism undergoes reorganization of the most far-reaching sort, both on the side of mind and on the side of behavior. And this reorganization does not always proceed smoothly; the previous set or pattern of determining tendencies has

³ Ames, E. S.: *The Psychology of Religious Experience*, Boston and New York, 1910, pp. 219-221.

established certain associative connections and certain habits which persist and may conflict with the new attitudes that are coming in. And again, in later middle-life the objects upon which attention and feeling and action have hitherto been largely centered, change. The young are now mature and no longer require or solicit the fostering attitude in the parent. The reorganization at this point, however, does not always proceed as smoothly as it does at the animal level, when, for instance, the parent-bird, at the appointed time, pushes its young out of its nest and settles down to replenish its own depleted store of energy. That this later period presents a fairly definite occasion for far-reaching neuro-glandular and neuromuscular readjustment is clear; and many of the available records indicate that here there may arise, at times, crisis-experiences involving often a complete modification of mental attitudes and of overt behavior—modifications that have their rise in something possessing many of the marks of typical religious ‘conversions’ or ‘illuminations.’

Apart from the differences in overt behavior that characterize these two periods, they present also marked differences with regard to mode of functioning of the nervous mechanisms. At adolescence there is a state of *tension* due to the partial stimulation of new action-tendencies which may not, however, find overt expression by reason of the fact that the new behavior-system is not yet organized, or by reason of the relationship of mutual inhibition between the emerging adult tendencies and the tendencies of childhood. At the later period of the life-cycle, on the other hand, the typical condition, so far as the neural processes are concerned, may be rather a slowing down of the action-tendencies, an *Abklingen*, of the motivation that was hitherto dominant.

But then again, while there are these differences be-

tween the two periods on the side of nervous action, the accompanying phenomena on the side of organic functions, under these conditions, show a certain similarity. There are indications that in a 'normal' biological development the later period, with its temporary lull in the strenuous striving of middle-life, is accompanied by a tuning of the organism in the direction of a renewal of energies. There is a favoring of the anabolic functions (not necessarily a laying down of adipose deposit!) that indicates a parallel to the process going on in the individual during the period of sexual maturation in later adolescence. As at adolescence, such an access of energy—accompanied by a heightened reactivity of internal physiological processes that register in mind as various kinds of vague desires, wants, longings—leads the individual to seek, he knows not what, and during the course of this questing he will come from time to time upon objects, perceptual and ideational, which tend to release the reaction of joyful discovery. In physiological terms this means that the tension-set of seeking and striving is suddenly replaced by another, physiologically opposite, set in which the organic processes, basic to joy, hitherto inhibited by the tension-set of restless longing, arise. Ofttimes such objects or ideas will occupy attention with the same degree of vividness attaching to them that is characteristic of the interested attention brought by childhood and adolescence to the new objects of their respective worlds. "I saw no new thing but I saw all the usual things in a miraculous new light,—in what I believe is their true light. I saw for the first time how wildly beautiful and joyous, beyond any words of mine to describe is the whole of life," writes such a one.⁴ Ofttimes also at this later period there may occur once more the phenomenon of a striking richness of meanings, subtle and recondite, pro-

⁴ Montague, M. P.: *Twenty Minutes of Reality*, New York, 1917, pp. 8-9.

found though inarticulate, which have their bodily basis in the various new organic and nervous sets that are coming in, so that there attaches to experience, after the humdrum of middle-life, once again that flavor of newness, unknownness, and yet of intimacy—in a word, of mystery—that characterizes the awakening at adolescence.

It is at these two periods in the life-cycle that the phenomena of the so-called religious experience find their typical setting. They are primarily periods of neuroglandular reorganization, conditioned in these cases by the biological development of the organism in the life-cycle. But it would be a mistake to infer that such reorganization is limited to these two periods in the cycle. The conditions of long-continued inhibitions, which are characteristic of adolescence, may occur at any time. Social, economic, and educational forces are constantly operative in producing the individual who has become chronically 'repressed'—as is for a time the adolescent—in whom there arise the rather obvious phenomena with which the psychoanalysts have made us sufficiently familiar. In such lives there may be a sudden freeing from this tension-state and the supervening of an opposite phase of relaxation, accompanying the operation of the hedonic, or pleasurable, set in which the waste of anxiety and worry gives way to the attitude that means, physiologically, the up-building of the organism.

Again, the phenomenon of *Abklingen*, of quieting down of desires, purposes, and ambitions that enter into the usual pattern of adult living, may appear not only in later middle-life but at any time in the life-cycle. This is the phenomenon that actually occurs in the case of the 'disillusioned' and the 'disenamored,' in periods of cultural sophistication. And if, in such, all secret hankering after the old objectives, all the old feeling-attitudes with reference to them, are truly in abeyance, so that these objec-

tives no longer keep the tension-set stimulated,—then there may occur that ‘enchantment of the disenchanting’ that will be dependent no longer on any particular object or objective. In the words of Plato, one,⁵ thus enchanted, “drawing towards and contemplating the vast sea of beauty, . . . will create many fair and noble thoughts and notions in boundless love of wisdom, until on that shore he grows and waxes strong, and at last the vision is revealed to him of a single science, which is the science of beauty everywhere . . . beauty absolute, separate, simple, everlasting, which without diminution, without increase, or any change, is imparted to the ever growing and perishing beauties of all other things.”

Not only the adolescent, not yet lost in particulars, and the mature man or woman, already freed from those particulars, but anyone in whom this condition of detachment occurs spontaneously or is achieved through training, will represent the psychophysical set in which there may be released the bodily processes that have as their counterpart, on the side of mind, a flooding of consciousness with the feeling-qualities of wonder, of beauty, of joy, and of love. And this, for a brief space until followed anew by the tensions that grip the organism in the aggressive striving and straining after new objectives with the narrowing down of attention to new particulars that are jealous of relaxation, constitutes the condition also under which the experiences called ‘religious’ may supervene. . . . May this be the wisdom of the ancient command of Jehovah?—“Be still and know that I am God.”

⁵ *Vide the Symposium.*

XIV.

PSYCHOLOGICAL METHOD AND THE RELIGIOUS EXPERIENCE

THE psychological and physiological approach to the problem of the religious life holds promise of giving an intelligible setting to that problem and to the extant data, that otherwise remain curiously unrelated or retain the mark of partial—largely a sectarian—interpretation upon them.

The absence of an organizing principle is well illustrated by the discussions of the part played by emotion in the religious life. The lack of scientific method in the field is most clearly apparent at this point. The 'religious life' is often taken as an entity of some sort, and without analysis and on the basis of partial observation some particular emotion is assigned to it as its mark. As a matter of fact, all types of affective or emotive states enter into the composition of the religious life—and that in a characteristic temporal pattern that is fundamentally conditioned by physiological laws. Most discussions ignore the fact that experience is a temporal affair that runs its course in terms of qualitative changes in mental processes. Not one, but all the feeling-states enter into this temporal patterning; gloom and cheer, anxiety and hope, love and fear, hatred and trust—yes, jealousy, anger, and contempt—all these complex states put in their appearance in the accounts of the religious experience.

So long as the historical material is viewed *en masse*, the task is at first blush bewildering and all that the psychologist has sometimes seen fit to do is to describe the phenomena, pronounce them highly complex, and add, perhaps, here and there, a bit of explanation lifted bodily from the relevant chapter in general psychology. And so,

for the most part, the problem rests at the stage where the anthropologist and the historian have left it,—a rich and varied material still awaiting classification and explanation at the hands of psychology and physiology. Not until this work has been done, may we expect a fruitful statement of many of the special problems of great interest. Thus the discussions of the difference between 'primitive' and 'higher,' between Aryan and non-Aryan, between Eastern and Western, religions will remain futile until the ground-work is laid for a truly scientific approach.

One of these special problems, for instance, that must wait, is the question as to the apparent emphasis upon either of the two major feeling-attitudes of cheer and of gloom in the religious life of different peoples. There is the possibility that over and above the tendency of an alternating rhythm in the affective life, there may be also a more or less permanent polarization with respect to one rather than the other of these moods in certain races. The maintenance of this polarization would then be a matter of physiological predisposition or set, which might be congenital or develop under environmental influence, either social or physical. The reader will call to mind at once the proverbial gloom of the Nordic religions and the equally proverbial cheer manifested in the religious life of Southern races. Here climatic conditions may ultimately be found to enter in to tune the physiological organisms of individuals in characteristic ways—and thus a selection may also go on that fixes the predisposition in the race.

Another such special problem that must still wait for scientific formulation arises in connection with the observation that different emotions come to play a dominant rôle at different levels of culture and of intellectual development. It is often alleged that on the emotional side the religion of 'primitive' peoples shows a large ingredient of

fear, whereas in the religious life of peoples at the 'higher' cultural levels the sentiments of love and sympathy are held to predominate. This very simple generalization is made possible first of all by ignoring completely the fact that on the side of mind and also on the side of motor expression, the very large phallic component in primitive culture has much in common in the way of essential attributes with the 'love' of a later age. And secondly, the generalization ignores those other developments which take on a direction other than that of love in the later cultural stages. Thus some of the higher religions of India deprecate, like Christianity, the phallic elements so prominent in the life of the early stages of human culture; but, unlike Christianity, they often attempt to achieve a negation also of that 'higher' love by which Christianity set so much store,—a negation which on the side of expression may have given rise to certain characteristic features in the culture of those peoples.

The questions cited are important and serve to indicate clearly that the emotional side of the religious life of races and individuals is a highly complex affair. And as a problem it requires more careful definition than it has thus far achieved in the current literary and historic treatments.

A scientific approach from the side of physiological psychology offers two important items in the way of technique. One is the determination of the organic basis of the various affective qualities that may be differentiated in the emotional life and the other is the inquiry into the patterning of these qualities in their relation to one another as the emotion runs its course. This technique, applied to the phenomena of the affective processes entering into the religious life, holds promise of clearing much ground for man's approach to a dignified understanding of the nature of his place in the universe. Its application

to the data consists essentially in tracing the *temporal course* of the emotive state described in terms of qualitative changes. Such a statement of temporal course would indicate first the typical affective tuning antecedent to or leading up to the event in 'conversion,' 'illumination' or by whatever name it may otherwise be called, and, secondly it would give a description of the subsequent course of feeling-attitudes.

Such a statement implies again that crisis which was mentioned in the last chapter, and we would recall what was said at that point with reference to the fact that not in every individual experience is such a crisis discoverable; we would recall the special emphasis that has sometimes been put upon such a crisis by instituted society; and we would recall that we hold no brief for the formal interpretations as to the essential or non-essential character of 'crises' on the part of instituted ecclesiastical systems. With all such interpretations we have here no direct concern.

But as we proceed it will become apparent (i) that it is the crisis-situation which presents most favorable conditions for the analysis of experience; (ii) that analysis indicates the psychological *differentiæ* of these crises to consist of typical patternings of the mental processes, that may, however, be found also at other points, in experiences that are not usually considered as possessing religious significance in the sense of the formal instituted systems, and that yet function, psychophysically, after the same manner; and (iii) that the type of adjustment effected in such a crisis may conceivably also be achieved without its taking on the cataclysmic form, but can occur as a gradual shifting in the major attitudes, which may, indeed, be the more usual thing in human development—as when the poet points out:

Souls there be to whom 'tis given
Easily to enter heaven;
Scarce an effort on their part,
Without struggle, prayer, or art;
Sometimes utterly unknowing
Why such glory should be showing;
Wondering what the reason is
Of the inflaming ecstasies
That Christ giveth unto His.¹

A predisposition of the psychophysical organism then, as well as cultural and institutional factors, may operate at times in the direction of decreasing the likelihood of sudden emotional crises in the individual experience. But even so, there falls to psychology the task of giving a descriptive account of typical ways in which the affective life runs its course in such a crisis. For it remains true that it is just such crisis-situations that present favorable conditions for the analysis of experience, and if the religious life has any *differentiae* at all, these must be registered as typical differences in the patterning of mental processes and of behavior-tendencies arising in consequence of the 'change,' as compared with the characteristic patterns of mind and behavior before the crisis or change. And it is to this analysis that we shall now address ourselves.

¹ Walter Leslie Wilmshurst: "The Mystery of Light," in *The Oxford Book of English Mystical Verse*, Oxford, 1917, p. 483.

XV.

THE EMOTIONAL ANTECEDENTS OF THE RELIGIOUS AWAKENING

THE question is: What is the nature of these emotional antecedents that lead, in time, to such crisis-experience; and do they present any typical patterns inherently conditioned by the nature of the psychophysical organism, apart from the suggestions coming from the social *milieu*? When the question is thus put, it becomes possible to survey the facts and to discover a number of typical developments leading up to the crisis, conversion, illumination, spiritual rebirth, regeneration—or whatever else the event may be called. These typical antecedent developments may be characterized briefly: (i) the piling up of tensions resulting from the inhibition of action-tendencies, with the affective tuning belonging to such tension-states, *viz.*, anxiety, expectancy, restiveness, irritableness; (ii) the exhaustion of the organism as a result of over-stimulation and over-exertion, with the accompanying affective coloring of weariness, *ennui*, despair; and (iii) the dying-down of the ‘driving’ impulses and the supervention of affective calm.

The first of these types of development is most completely represented in the adolescent. Coe summarizes his findings with regard to the emotional antecedents of adolescent conversion: “A mental burden, a sense of unrest, dissatisfaction with self, a general discontent, a feeling of wanting something and wanting to be something that is not clear to one’s self—this comes as near as anything to describing the spontaneous feeling. . . . It thus appears that the soil of adolescent religiousness, as far as the feelings are concerned, is an undefined sense of incomplete-

ness, a tantalizing awareness of something as belonging to one's true self, but not yet realized in one's self."¹

On the physiological side we have in adolescence the rise of new 'sets,' or determining tendencies, involving not only new neural integrations, but more particularly a new organic set with a change in the chemical balance within the body. This new physiological organization, though ready for operation, is not, however, as yet complete in that it has not yet developed a system of adequate motor habits of overt behavior. And, furthermore, while thus physiologically keyed for action, the adolescent has not yet entered into possession of a world in which the stimuli adequate for the release of responses in the direction of the new determining tendencies are forthcoming. In other words, he has not the opportunity for action.

These physiological conditions are accompanied, on the mental side, not only by organic sensations generally, but by that particular patterning of visceral and muscular sensations and of feelings characteristic of the emotional tone of anxiety. The outstanding feature of adolescent experience that precedes religious awakening, if it occurs, is the anxious waiting for, and searching for, the stimulus that shall release the complex action-systems that willy-nilly are still being kept in a state of inhibition. This emotional state is prominent especially where either cultural, or internal organic factors operate to delay the development along the more purely biological lines.

"Oh, if I but were a horse or a dog," says one adolescent, "then I wouldn't have to think the things I think and struggle within myself!" The content of the wish here is essentially in terms of an ordered life—ordered by 'nature' in such a way that it is not necessary to think and to plan. In point of fact, however, it is true that nature has left the individual's behavior-system in large

¹ Coe, A. E.: *The Spiritual Life*, New York, 1900, pp. 51 f.

part to be built up under the selective influences of environmental conditions. To be sure, as we look upon the well-ordered life of the robin, for instance, we are impressed by the fidelity to the model of robin respectability,—the faithful mate and parent, doing its tasks each at the appointed season in the appointed manner,—passing from nest building, when the robin is 'set' for perceiving longish objects which it weaves into the nest, to the fostering set when it is no longer organized for apprehending longish objects but becomes particularly keen in the discrimination of certain slight disturbances of earth-surface to which it reacts in that characteristic manner which we have all observed as it braces itself and extracts an earthworm from its burrow, for feeding the ever-hungry mouths in the nest.

All this appears, at first blush, like a preëstablished pattern laid down in the bird's anatomy, but when we take into account some of the observations that have been made on birds, our views concerning what was once called 'instinct' become somewhat modified. The periodic character of certain determining tendencies is an observable fact—but so too is the fact that under modified environmental influences this periodicity may be upset. Craig points to the fact of conflict between the mating and the nesting tendencies in brooding doves.² He imitated the call of the mate while the dove was in the presence of her eggs. The 'hesitation' that he observed in the dove indicates that although the dove had arrived at the brooding stage in the cycle, mating tendencies were nevertheless not completely in abeyance. And so one wonders whether even the robin, that model parent, might not also be lured from its straight path of *bourgeois* morality if proper inducements were held out.

² Craig, Wallace: "Stimulation and Ovulation in Birds and Mammals," *Journal of Animal Behavior*, iii, 1913, pp. 215-221.

Again, if we once were quite certain that the English sparrow is pre-ordained to chirp like a sparrow and every Baltimore oriole to sing always the love-song of its race, we must now become a bit more cautious. For the sparrow, exposed to the 'higher' cultural atmosphere of canaries during the days of attainment of voice, develops a fair replica of the canary *repertoire*—not that it has all the smoothness and exquisite timbre of the song-bird's, but nevertheless it is a passable imitation. So, too, we learn that the Baltimore oriole does not appear upon the scene of oriole-activity with song all complete and ready for its serenade; no—it, too, gets both its pattern and its finish in the school of social relationships.

Clearly, then, the youth who envies the animal because of action-systems all ready and nicely ordered, is suffering under a misapprehension of fact. Crises, here, as in the human world, arise by reason of incompleteness of action-systems, non-appearance of appropriate stimuli, conflicts between different action-systems, and conflicts between several stimuli.

It is just this incompleteness of the action-system and the failure of the stimulus to put in its appearance, that favors the acquisition of a rich store of cultural experience on the part of the individual. Under these conditions the muscular tension has open one avenue of expression on the side of action, namely, the search for a stimulus. By this we mean only that general restlessness in animal and man which results in continued modification of the individual's orientation to the environment. The world of stimulation that is thus presented is constantly changing and thereby is increased the probability that an adequate stimulus will ultimately be come upon. At the higher level in the animal scale this mode of activity may take on a fairly definite form, *viz.*, that of poking the anterior end of the body with its greater sensory equip-

ment into all sorts of places. The human child, at any rate, may thus receive a mass of impressions which are the material out of which its 'experience' is constructed. In this way both in the human child and in the animal young there are built up habits of response that later become organized and thus become constitutive elements in the very action-systems that are at this stage of seeking still relatively incomplete. The importance of this is brought out by the studies on the conditioned reflex, to which we referred in an earlier chapter. Pavlov and his students discovered that in order to get saliva to flow in response to ice applied to the outer skin, this novel 'conditioned' stimulus during training must be given *first*, to be then followed by the 'unconditioned' physiological or hereditary stimulus, *i.e.*, the food. If the food is given first, the new habit of responding with the flow of saliva to the ice-stimulation on the outer skin is rarely acquired.

When we turn to consider the working of this principle in the process of development at adolescence, we find that it operates primarily in attaching 'interest' to all sorts of things. The organism, in the course of its seeking, is constantly being acted upon by all kinds of stimuli. The sensory threshold is lowered all along the line. Novel objects, especially, are attended to, and in being attended to, a certain set of organic reactions that are peculiarly ready to go off at this stage of development, may be released. On the mental side this response consists in the 'thrill' of joy, wonder, or beauty with which the manifold presentations of an ever-changing world are greeted. On the bodily side this 'thrill' involves primarily an organic, visceral, reaction of the emotional sort, rather than a response of the skeletal musculature—lungs, vascular system, diaphragm and abdominal viscera are all involved. Although complex, this bodily response displays as definite a pattern as do the bodily accompaniments of the

sthenic emotions, fear, anger and anxiety. But whereas these involve primarily a heightening of the tonus of the skeletal musculature and an increase in flow of blood to the periphery, while at the same time the functioning of the mechanisms of the digestive tract is impeded and the blood withdrawn from the lower viscera,—the typical emotion that arises in the adolescent when he momentarily envisages some object with an ‘ineffable,’ ‘indescribable’ thrill of joy and beauty, is characteristically one not of overt action, but of suspension of action, accompanied by a facilitation of certain visceral processes of the anabolic group.

To be sure, the very next moment, he may once more be bent upon the quest after that undefined object that shall give adequate release to his as yet unarticulated action-tendencies. But this does not alter the fact that for a brief space the things of nature or the faces of women and children, were lit up by the effulgence of youthful wonder, reverence, love.

Here our analysis brings us to close quarters with that æsthetic emotion which philosophers have so often clothed in the needlessly paradoxical terms of ‘disinterested interest,’—an emotion conjoined, in part, on the bodily side, with the attitude of contemplation rather than with a heightening of general motor reactivity. It is the picture of the young lover presented to us in the ‘movies,’ heart whole and fancy free, who suddenly sees *the* maiden. He does not approach her, but wanders off to the seaside and gazes at the horizon. The picture reinstates Dante’s vision in the *Vita Nuova*, of which Witte^s writes: “Her beauty, her goodness, all her perfections are to him but proofs of God’s unending love; and even her physical beauty leads not to desire but to a sacred joy in the glory

^s Witte, Karl: *Essays on Dante* (trans. and ed. by C. M. Lawrence and P. H. Wicksteed), Boston, 1898, p. 10.

God has revealed to the world. Here are no unsatisfied desires, no jealousy and no complaints. The beloved herself is only the most wonderful and most precious among the flowers that bloom in the consecrated garden of God, before which we stand in silent rapture and breathe its perfume, without any desire to pluck the rose from its stem. Her voice is only the sweetest among those of a thousand nightingales to which we listen with no desire to catch them. The pomp of the flowers, the quiet of the grove, the chorus of praise of those who dwell therein, speak of the glory of nature, of the goodness of its creator, and lift the mind of the ecstatic beholder into the regions of pure blessedness."

At times when the biological stimulus continues for a while to remain below the threshold, we have that delay in the development of the individual which favors the sudden rise of a succession of interests, some of which are colored by the various, as yet inchoate, trends of different biological functions. The organism is tense, seeking it knows not what. Its attention lights on some object and it responds to it in terms of its tremendous capacity for being interested. Here belong the sometimes transitory, sometimes permanent, scientific interests. Here also arise the various interests in social relationships, often with a highly emotive coloring shown in general in the love of fellowship and in the desire for opportunity for service. And finally we have here those moments of experience in which the activity of searching, of seeking, suddenly ceases on the part of the organism and, though no new factors have been introduced into the potential stimulus-complex presented by the environment, the individual just as suddenly reacts with the response of joyous discovery—an experience with definite marks, both psychological and organic.

In this biological setting we recognize this last reaction

as possessing the essential characteristics of the religious experience. It is preceded by the inhibitions and muscular tensions and organic states which are peculiar to unsatisfied longing and restless seeking, involving the emergence of all sorts of objects at the focus of attention, all of which promise, but fail, to possess that measure of stimulus-value adequate to release in any marked degree the particular physiological response underlying the experience of joyous discovery. But the delay in the appearance of the adequate stimulus is operative in heightening the reactivity of the physiological function involved, so that presently this may be set off by almost any stimulus that chances at the favorable moment to be attended to.⁴

The second typical set of emotional conditions antecedent to religious awakening presents a very different but equally characteristic pattern. It is not determined physiologically by the presence of a rising supply of energy as in the normal adolescent, but rather by a depletion resulting from an over-stimulation of the organism's sensory-motor mechanisms that are operative in its habitual pursuits, to the point where physical fatigue and mental weariness set in. Such weariness is well described by the poet:

With brain o'erworn, with heart a summer clod,
With eyes so practiced in each form around,—
And all forms mean,—to glance above the ground
Irks it, each day of many days we plod
Tongue-tied and deaf, along life's common road.
But suddenly, we know not how, a sound

⁴ In the case of the average human being the stimulus for releasing this physiological response in its full intensity is given in the apprehension of the biological mate, to which this reaction then becomes promptly attached. James's observation: "When objects of a certain class elicit from an animal a certain sort of reaction, it often happens that the animal becomes partial to the first specimen . . ." still holds.

Of living streams, an odour, a flower crowned
With dew, a lark uprising from the sod,
And we awake. O joy and deep amaze.⁵

It would serve no purpose to multiply illustrations in which the affective antecedents of religious awakening are of this mode. It is not the tense anxiety of the adolescent, restive because the avenues for action open up too slowly for his eager spirit, but the depression, fear, and loss of faith that sometimes come, especially, it seems, to those who are caught up in a social and economic process which drains their energies without adequate regard for the physiological mechanisms that might operate in counteracting the toxic effects of over-stimulation of bodily functions.

Over-stimulation of this sort is sometimes thought of as being the peculiar mark of our contemporary life. That the effects of it are very widespread is attested by the tremendous sale enjoyed by the popular books holding out promise of cure for nervousness, and by the many advertisements offering remedies for mental or physical woes to the citizenry of a harassed world. "Whipped into utter weariness"—to use the language of some of these advertisements—"by that malevolent monster, the high cost of living, would you"—these advertisements go on to ask—"be equal once more to the struggle?" Why, then invest at once in Smith's rubber heels or enroll promptly in Jenkins-Price's infallible course in personal magnetism and replenish your depleted energy and vanished powers, and become irresistible in all walks of life.

Not our concern the adequacy of such remedies. We would, however, distinguish the feeling-attitudes that are described in the advertisements and that typically accom-

⁵ Edward Dowden: "Awakening," in *The Dublin Book of Irish Verse*, Dublin, 1909, p. 468.

pany the physical exhaustion consequent upon long-continued or excessive stimulation of bodily functions, from the feeling-attitudes characteristic of that condition in which complex action-trends prepared to function are restrained or inhibited, as in the adolescent.

Finally, the case-histories show a third type of development antecedent to the change in psychophysical set in the religious awakening. It is most adequately indicated as belonging to that phase of an organism's activity in which any impulse, having run its course, ceases to set the organism in so definite a manner as it did at other times for the given mode of reaction to a given stimulus. In the case of many physiological functions a period of lowered reactivity follows a period of heightened functioning. We have already had occasion to note that within the larger life-cycle there may occur a similar process in connection with the major behavior-tendencies. At maturity certain childhood tendencies drop out; in later middle-life those complex impulses that were operative in, and constituted the pattern of, the life of the adult, lose their organic tang and propulsiveness. As such periods of biologic change approach there is a gradual *Abklingen*, evanescence, or lowering of intensity of experience on the affective side.

The following incident is taken from the case-histories by way of illustration. A woman, living in a small town in the Middle West, writes:

It was on the occasion of the first anniversary of my youngest child's marriage. I was walking down the road, thinking of the events of the past twenty-five years of my life. How my husband's early death had left me with the problem of caring alone for our children; how for years I struggled to make both ends meet and at the same time burned with anxiety lest somehow I

should miss being all a mother should be; how there was a mingling of relief and regret when one by one they entered each into a life of his own; how a year ago the last one left our little home. How I closed the door upon reëntering the house that evening in much the same mood in which one might close a finished book; how I had lived a whole year in much that same frame of mind and wondered whether the rest of my days would always be like that. It was then that the thing happened. I seemed suddenly to experience my whole life over again. Everything in it seemed to be there at once. But now it was all different. I understood everything in it, and it seemed that all the questions I have ever asked were answered in that one moment. I could now smile at my faults as well as at my painfully anxious dutifulness. If at times I had been longing for my children during the past year, that all was past. It also seemed as if the days to come were also there if I had wanted to know them.—The things about me too were different, but how I cannot say. Then I noticed that the people whom I passed on the road were seen in a new way. I seemed to see them not from the outside but, strange to say, from within. There was a queer feeling that I knew them better than they did themselves, for I seemed to know them as I now know myself—while they knew themselves only in the same way as I had up to this time known myself. I cannot say that I was happy—for happiness had been to me always something which was bound to be spoiled. And this was something different. I seemed very quiet but also I experienced a joy that seemed to spread over everything. My body felt as if it never would grow tired again. The dog that crossed my path didn't frighten me or else I didn't frighten it which I usually seemed to do. It followed me to my very door. The first satisfactory experience that I had ever had with dogs. And it seemed to me that it too looked different. And since that day I have never been afraid of anything and often during the day in my shop or walking out in the fields or on the road, I find that same Thing come over me—and straightway all tiredness is gone.

We have given this account at length because it illustrates a typical case of *Abklingen* of the major action-

tendencies after they have run their course in the life-cycle; and in this 'petering out,' this dying off, of a once dominant psychophysical set, we have the conditions which, in some lives, constitute the antecedents of a reorganization, a new 'awakening.' In this case it was neither sought nor expected; it just happened. And on the side of mind, it is not the feelings of pent-up-ness and repression nor of weariness and depression, that precede this psychophysiological reorganization, but a state of affective calm.

There have here been pointed out three types of affective conditions antecedent to religious awakening.

The first of these involves on the physiological side an inhibited state of the behavior-systems, while the organism as a whole is tense and ready for action. On the mental side the emotive tone has peculiarly the quality of anxiety, sometimes complicated, perhaps, by the further presence of diffidence. In general it is closely kin to what Kraepelin⁶ has called *expectation-neurosis*.

The second type is characterized, on the bodily side, by an over-stimulation of bodily functions to the point of fatigue; and on the mental side the affective pattern is identical with the one described by Kraepelin in connection with *exhaustion-neuroses*, the symptoms of which, he says, are readily recognizable in their mild form by anyone who has ever been forced to work for a long time beyond his strength. Weariness, depression, disgust, despair, are the terms readiest to hand for pointing out this type on the mental side.

The third typical antecedent condition is characterized, physiologically, chiefly by what we have called an *Abklingen* of certain ones of the major heritable action-tendencies after they have run their course. This may take place

⁶ Kraepelin, Emil: *Psychiatrie*, Leipsic, 1909-1915.

at certain regular periods in the life-cycle, or, under special conditions, as in convalescence, when the usual desires, wishes, purposes, that constitute the prevailing determining tendencies, have been temporarily eliminated by sickness. Its distinctive mark, on the side of mind, is the feeling-attitude of calm.

None of these antecedents, of course, are to be found represented in their pure form in the development either of individual or of group experience. Human nature in the concrete cannot be stated in terms of simple formulæ,—but the physiological functions which we have seen to be operative are not artifacts: their mechanisms have been analyzed and the different kinds of emotive states depending upon them have been ascertained. And so, may we not see here the basis for the psychological and physiological differences in such types of development as are portrayed, for example, on the one hand, in the story of the ardent young Teacher of Galilee, with his joyous message of a transformed and transforming love, and on the other hand, in the accounts of the venerable sages of India into the fabric of whose lives is woven unmistakably the pattern of an ‘awakening’ occurring at a maturer age, and sought systematically, we are told, after one has participated in the usual life of the world as a ‘householder’?⁷ The adolescent emphasis on loving fellowship and on consecrated service in the one, the seeming dispassionateness and kindly tolerant aloofness from our common humanity in these others—can now be understood in physiological terms without recourse to metaphysics.

And if we examine these antecedent conditions that are found to precede the religious awakening, we discover that, diverse though they may be on the psychological side—whether the anxious expectancy of the adolescent, or

⁷ This difference comes home to one forcibly upon a comparison of the *Gospel according to Saint John* with the *Upanishads*.

the weariness of overwork, or the calm that accompanies the *Abklingen* of once dominant determining tendencies—they yet have this in common on the physiological side: they are typically conditions involving in some form or other a temporary cessation from ‘direct action.’

XVI.

THE FURTHER DEVELOPMENT OF EMOTION IN RELIGIOUS EXPERIENCE

THE central fact in all descriptions of religious awakening following upon such antecedent states as *ennui*, anxiety, and weariness, is the occurrence of the emotion of *joy*. The reports, laid down in many lands, and during many centuries, all bear witness to this central fact. Leuba, in his extensive study, finds that joy "is never wanting."¹ Indeed so much has this been dwelt upon and so much advertising power has such constant emphasis had, that some were led into expecting that they would "experience an overwhelming joy and peace unbroken," only to report ultimately that "none of these things came out as I expected."²

But when this emotion does set in, what are its characteristic marks? We note that, apart from what may later happen in the psychophysical organism, the moment when such joy arises is a moment of temporary suspension of action on the part of the habituated and the original behavior-tendencies. This suspension of action is the forerunner of a characteristic set or attitude which the organism assumes, for the moment at least, when the religious awakening occurs. It is an attitude of concentrated attention—attention to things or thoughts that have suddenly been raised to a high level of clearness in consciousness. Something, or everything, has somehow been changed completely, and it is this fact of changed appearances and changed meanings that momentarily rivets attention. And under these conditions the act of attending gives to this experience on the mental side its own characteristic

¹ Leuba, J. H.: "A Study in the Psychology of Religious Phenomena," *American Journal of Psychology*, vii, 1896, p. 351.

² Coe, A. E.: *The Spiritual Life*, New York, 1900, p. 148.

emotional coloring: that of wonder. "And we awake. O joy and deep amaze," writes Dowden. There is for a brief space relaxation instead of muscular tension,—the habituated strivings are at rest, the blood that had been drafted to the periphery, away from the viscera, now may once more flood the internal organs. There are some indications that under such conditions there is also a facilitation of action in the nervous system, resulting in a more widespread propagation of stimulation throughout the brain which may be the basis of the richer meanings implicit in such moments of experience; and there is the possibility that this effect is attributable to the action of internal secretions affecting the nervous system specifically in this direction after a manner somewhat analogous to that of chemical substances sometimes introduced into the organism from without by ingestion or injection. The loosening up of the associative connections in this experience is at any rate parallel, in respect of the effect upon the synaptic relations in the nervous system, to the action of such drugs as strychnine and alcohol. And if a hypothesis, not entirely fanciful, be permitted at this point, the conditions of momentary quiet, so far as the muscular reflexes are concerned, may permit a certain integration in the nervous system that would allow the sub-cortical centers to contribute, perhaps, their own quality—a feeling or a meaning—to the total complex. This hypothesis is not new; it has been invoked in the past to account for the 'fringe' of meaning or implication that belongs to the perceptual and ideational complexes,—a fringe that seems to evanesce when attention would make it clear or explicit.

But whatever the ideas, and thoughts, and implications may be that are given within the moment of religious illumination, and whatever the further developments may be, there is always this central emotion of joy, often mingled with the sentiments of wonder and of awe,—when it

is felt some change is wrought in the personality, 'transfiguring all the sequence of one's days.'

These facts concerning the emotion of joy are important. Whatever may happen afterwards, there is here, for a brief space during the emotive state, a setting of the organism that has neither the muscular tensions of the adrenalistic states like anger, nor the slump of the depressor states like exhaustion and despair. It is a moment of very lively inward keying that results in a clearness and 'depth' of the mental processes and a richness of associative connections on the one hand and a release of various visceral processes on the other—vasodilation, tuning of the alimentary functions, etc.—which favor physiological anabolism, and contribute perhaps, on the side of mind, also characteristic sense-feelings to the total complex of the emotion of joy at this particular point in its course. These considerations are here entertained for their bearing upon the possibility of the 'fixing power' which this organic tuning may have in favor of the new neural correlations and coördinations arising under these conditions—indicated by the apparent 'insight' and the conviction that 'some change is wrought' which is reflected henceforth in the mode and pattern of experience. We are reminded of the ancient 'pleasure' that the psychology of twenty-five years ago invoked in explanation of the 'stamping in' of reactions in the 'learning process.'

But what, we may now ask, is the further course of emotion following this moment of illumination—which in itself is usually very brief? While the organism may not maintain this attitude of 'suspension of action,' as we have designated it, for any great length of time, some of the items may continue over into the succeeding phases as the experience runs its course. This course may assume one of three typical forms: (i) a release or facilitation of motor 'expressions,' (ii) modification of visceral proc-

esses, (iii) organization within the nervous system resulting primarily in the facilitation of cerebral processes. Thus, (i) 'converts' have been reported to have 'howled and danced for joy'; (ii) the individual may discover a beneficent augmentation of breathing, circulation, and other organic processes; or (iii) such a one may simply walk quietly with the memory of some vision of the *Vita Nuova*, that came to him in the high moment, cherished in the heart.

It is the first of these, the release and facilitation of 'motor expressions' that has loomed large in the view of many students not only of primitive religion but also of the religion of civilized peoples. At all times, amongst all races, at all levels of culture, moments such as these have given rise to howling, crying, dancing, 'jumping,' 'rolling,' 'quaking,' 'shaking,' and orgiastic manifestations of all sorts. Often these expressions spread throughout the social group. Not always do they remain unorganized but may take on conventionalized forms under the operation of imitative tendencies. Some of the profoundest of the religious songs of the American Negro, revealing a marvelous capacity for artistic restraint, developed under these influences. Often however the motor manifestations remain individual and entirely lacking in the formal grace of these Negro expressions. It is difficult, for instance, to maintain a proper scientific dispassionateness, when one reads in one of William James's cases: "I wept aloud with joy and love, and I do not know but I should say I literally bellowed with the unutterable gushings of my heart."³

Much of the so-called religious life remains at this level, even among sects of our own day. Such excitement is apparently sought for its own sake. It then develops neither art nor insight, and the possibility of the unfolding of a

³ James, William: *The Varieties of Religious Experience*, London, 1905.

technique for guiding the growth of personality, such as that laid down in many annals of the life of sanctity, is not even dreamed of. There is simply a release of energy,—that is all.

The second type of temporal pattern that the emotion may assume is conditioned by the modification of the course of the organic processes in breathing, circulation, and other visceral activities—all of which may lend color to the emotive consciousness. When these enter into the pattern of the emotion we may have a condition of relative inhibition of overt activity on the part of the skeletal musculature. The following illustrates this organic as over against the motor component: “It affected my body first in the brain, which actually I felt to quiver as with delight. It descended by my spine where it seemed to pass like living fire, until it possessed the whole nerve body, which literally thrilled with the joy of life.”⁴ And in the following account the visceral and organic component is still more striking: “With me the physical effects begin usually with a quivering and upheaving of the diaphragm which starts a wave of sensation upward through the chest region and into the pharynx, and results in incipient yawning.”⁵ The descriptions of Thomas Traherne abound in references to heightened organic activity: “A native health and innocence within my bones did grow,” and again, “I felt a vigour in my sense that was all spirit. I within did flow with seas of life like wine.”⁶ A similar augmentation of the visceral processes, without explosive or violent motor manifestations, is indicated in the following: “When I experience the presence of God. . . . I feel physically aggressive but self poised, exhilarated

⁴ Macbeth, James: *The Brotherhood of Healers*, Chicago, no date.

⁵ Pratt, J. B.: *The Psychology of Religious Belief*, New York, 1907, p. 254.

⁶ *The Poetical Works of Thomas Traherne*, ed. by Bertram Dobell, London, 1903, p. 5.

but not impulsive, my chest swells, my breathing is deep and satisfactory, and I seem to see the way to action opened up and strength to do it.”⁷

Many of the ultra-modern cults, both religious and religio-medical, emphasize and achieve essentially this type of experience, which is often characterized by poise and balanced control so far as the skeletal musculature is concerned, and by a setting or tuning of the organism with respect to the visceral operations in a manner which cannot but be conducive to a wholesome functioning of the anabolic processes, and thereby result primarily in increasing healthfulness.

A large part of the data, however, falls into a third class. For not always is the course of emotion characterized by an intrusion either of kinæsthetic sensations arising from a heightening of muscular reactivity as in shouting or dancing, or of organic sensations arising from a release of certain visceral processes. These may contribute, but they need not constitute the outstanding feature. The joy may be accompanied and followed by an unusual heightening of the vividness of consciousness in the state of attention, either sensory or ideational, or both. This, we saw, is a result that might be favored by the fact of the suspension of outward action characteristic of the moment when a change in psychophysical set takes place. The entire mental pattern may be cast in the mould of the æsthetic emotion indicated in the words of Edward Dowden: “O joy and deep amaze!” For Traherne the emotion is carried often in the dwelling upon rich, sensuous imagery:

Rich diamond and pearl and gold
In every place was seen;
Rare splendors, yellow, blue, red, white and green,

⁷ Pratt, J. B.: *loc. cit.*

Mine eyes did everywhere behold.
 Great wonders clothed with glory did appear,
 Amazement was my bliss:
 That and my wealth was everywhere—
 No joy to this.⁸

Similarly, Montague⁹ writes: "I only remember finding myself in the very midst of those wonderful moments, beholding life for the first time in all its young intoxication of loveliness, in its unspeakable joy, beauty and importance. . . . I saw all the usual things in a miraculous new light—I saw the actual loveliness which is always there. . . . And I knew that every man and woman, bird and tree, every living thing before me, was extravagantly beautiful." In this case the plethysmograph and pneumograph would probably reveal those organic accompaniments characteristic of sensory attention; let us note, however, that it is not the organic and kinæsthetic sensations arising from bodily activity that stand out in the field of attention, but the complex sensory patterns, giving us the objects of the world about us, which are raised to a high level of clearness and have attached to them the affective qualities belonging to the experiences of joy and of beauty. Amiel presents us with a description in which this attentive attitude is maintained, but this time clearness attaches not so much to sensory as to ideational processes: ". . . and again another night on the sandy shore of the North Sea, my back upon the sand and my vision ranging through the Milky Way; such grand and spacious, immortal, cosmogonic reveries, when one reaches to the stars, when one owns the infinite! Moments divine, ecstatic hours; in which our thought flies from world to world, pierces the great enigma, breathes with a respira-

⁸ *The Poetical Works of Thomas Traherne*, ed. by Bertram Dobell, London, 1903, p. 6.

⁹ Montague, M. P.: *Twenty Minutes of Reality*, New York, 1917, pp. 8 f.

tion broad, tranquil and deep as the respiration of the ocean, serene and limitless as the blue firmament. . . . Instants of irresistible intuition in which one feels one's self great as the universe and calm as a god.'¹⁰ Here then is the heightening of the vividness of sense-perception in an æsthetic setting, but what is more, the sensory stimuli release also associative trains that in some way tune, by reason of their organic reverberations that they in turn arouse, the entire visceral organization, and free the man, for the time being at least, of the inhibitions from which he may have suffered.

It is in this psychophysiological setting of 'calm,' of freedom from the pulls of the social *milieu* as well as of freedom from the driving impulses of the ordinary routine of behavior built up on the basis of the biological trends, that the state of the nervous system may thus be predisposed for perceptual attention to objects in the æsthetic experience or for the conceptual reaction in philosophic flights. Here also is the ground for those flashes of insight into one's own character, and for those 'white intuitions' that to some have opened the way to that 'inward' appreciation of the meaning and the possibilities of life that seem to be the substance of what Récéjac has called, in his *Bases of the Mystic Knowledge*, the "mysteries cherished of the heart."

Analyzed in this way, the data of the religious life fall into their proper place. The three typical developments of the religious experience that we have here traced with special reference to the part played by emotion, serve to indicate the differences not only of individual experience and character, but also of instituted ecclesiastical systems with their various formal procedures. From the point of view of social values, the three types of emphasis noted,

¹⁰ The *Journal Intime* of Henri Frédéric Amiel, trans. by Mrs. Humphry Ward, London, 1885.

viz., the augmented motor reactivity, the facilitation of visceral processes in anabolism, and the heightening of attentiveness, may be of very unequal significance. Not our concern here, their social value, but to point out that to select one of these and to regard it as representative would be contrary to fact. In a scientific envisagement the fact stands that neither the antecedent emotive conditions for the so-called religious awakening nor the further course of emotion within such experience, falls into a single uniform pattern.

Regarded from the point of view of organic tuning and the affective life, the paths that lead up to such moments of reorganization are various, and the paths by which those who participate in the 'religious experience' issue from it, too, are various. Some may come forth under conditions of accelerated or intensified motor expression, whether in work or in play, constructive or destructive; others under the conditions of a continued or recurrent preponderance of a certain patterning of organic functions, as is presumably the case in those who find in themselves spiritual affinity with various healing cults; and others, finally, under conditions which may possibly lead to a heightening rather of æsthetic appreciation and of philosophic intuition.

Not some one antecedent nor some one issue constitutes a common mark of these diverse experiences on the affective side. The one common mark that may so far be assigned to them is to be found in the central moment with (i) its relaxation from the tension-sets, (ii) its momentary facilitation of synaptic connections throughout the entire nervous system, indicated by a tendency either toward 'motor expressions' or toward a free play of associative processes in perception, imagination, and thought, (iii) its affective tone of the hedonic, or pleasurable, sort in the emotion of joy, and (iv) its precipitation into the

matrix of consciousness, though not into the focus of attention, of a mass of organic sensations which constitute the nucleus of the sense-feelings in terms of which the individual may become aware of his biological self.

XVII.

ATTENTION AND THE RELIGIOUS AWAKENING

THE analysis of the course of emotion in the religious experience revealed the fact that at the point where a shift in psychophysiological set occurs, there are given, for a brief space at least, the conditions that favor rapt attention to whatever object or idea may at the moment be in the focus. It might be said that rapt attention is so outstanding an item in the experience that the fact of attending becomes, in retrospect, its chief mark. Many of the records reveal, at least, that for not a few individuals the religious experience is constituted, as it were, by the discovery of the mental life, as *mental*.¹

A survey of the first hand accounts indicates that in the religious life there develops often marked psychological insight. The behaviorists are not entirely off the track when they use the adjective 'mystical' in referring to the psychology that deals in mental processes, for it is the mystics that have sometimes possessed a unique capacity for making detailed and keen analyses of their experience.

But whatever view one takes of the place of the 'mental' in the life-process, it is clear that its discovery 'as such' on the part of the individual often occurs in those phases of experience which the individual tends to call 'religious.' And this discovery is often made at the point of noting a number of psychological facts concerning attention as a mental state. Of the items that come out and that serve to throw light on the psychological organization of the experience as a state of attention, we would mention three. The first of these facts has reference to the

¹ Cf. Bennett, C. A.: "An Approach to Mysticism," *Philosophical Review*, xxvii, 1918, pp. 392-404.

type of organization of the mental processes with respect to the foci of attention; the second has reference to the heightening of the clearness-level of mental processes in the experience; and the third is the fact of the narrowing of the field of attention in the occasional development of hyperæsthesias and anæsthesias as hypnoidal phenomena within the religious experience.

First of all, the religious experience involves a passage from a state of attention wandering in many directions or distracted by conflicting stimuli, to a state in which the object of attention is a unified one. Systematic psychology, in dealing with the fact of organization of mind, discovers several typical patterns with respect to attention.² The facts that lead to a classification of attentive states are relatively simple. The several mental processes that are running their course at any one moment in mind are either integrated in such a way that there is a single focus with sensations of high degree of clearness on a background of less clear processes; or else there are several such foci. In behavioristic terms, we have either a single stimulus-complex eliciting the attention-response, or several stimuli functioning simultaneously, each tending to release its own system of responses. An example of the first is the baby's response to the thunderclap. An example of the second is Craig's nesting dove which was stimulated simultaneously by the visual stimulus of eggs in the nest and by the auditory stimulus of an imitated call of the mate. The dove, set for brooding, yet not insensitive to the blandishments of the mate, presents a typical case of conflict of stimuli and of conflict of action-tendencies.

The mental organization in the case of the baby's reflex response to a thunderclap would probably correspond to what Titchener calls primary attention, while the organi-

² *Vide* Titchener, E. B.: *A Textbook of Psychology*, New York, 1910, p. 94.

zation in the case of the dove would represent a state of secondary attention. The distinction is useful to characterize the progress of experience when religious awakening occurs. This awakening represents typically an emergence from that form of attention called secondary, in which there are conflicting foci, each presenting an object belonging to a different behavior-tendency. Nothing is more characteristic of descriptions of the first phase of religious experience than the rehearsal of a catalogue of burdens of all sorts continually 'forcing' themselves into the field of attention, and incidentally resulting in that typical inhibition of action which is all of a piece with the hesitation which Craig observes in the case of the doves mentioned above. James cites an excellent illustration in which the ideas of different objectives thus vie with one another in consciousness: "now marriage, now solitude, now Germany, now France, hesitation upon hesitation."³

But with the supervening of 'conversion' the mental organization passes from this secondary attention to a form in which these many foci—each belonging to a distinct action-tendency—drop out and are replaced by a single focus.

. . . the throng
Of dusty cares, hopes, pleasures, prides fell off,
And from a sacred solitude I gazed
Deep, deep into the liquid eyes of Life.⁴

In addition to making this distinction between different forms of attention in terms of mode of organization of mental processes, the psychologist attempts also to give some statement of the development of attention in the life-history of the individual or of the race. The nature of

³ James, William: *The Varieties of Religious Experience*, London, 1905.

⁴ Edward Dowden: "By the Window," in *The Oxford Book of English Mystical Verse*, Oxford, 1917, p. 337.

the problem is not always clearly stated, but whether we consider Angell's, or Pillsbury's, or Titchener's presentation, we come always upon certain genetic implications.

The fact that is to be noted is that at the lower level of the animal scale, and in the earlier stages of the life of the human being, we find that certain forms of stimulation call out, inherently, the attentive reaction, quite apart from training or learning. Here belongs that general statement that the conditions of stimulation eliciting primary attention are intensity, suddenness, novelty, and movement of the stimulating object. These induce reflexly the attention-response. Such attention is, in fine, response to stimuli to which the organism reacts by reason of the presence of an equipment of original (as over against acquired) behavior-mechanisms. And if we are interested more directly in the genetic problem, we would add to these general attributes of stimulus that are effective in eliciting primary attention, the specific forms of stimulation that constitute the 'original stimulus' or 'original situation' for evoking the untutored, reflex responses. Watson and Morgan tell us they never found momentary flashes of light in a dark room to elicit fear-reactions from a child.⁵ At most, they say, there is a blinking of the eyelids and a slight movement of the head. In other words, this type of stimulation elicits that adjustment of the sense-organ which constitutes on the side of behavior the attention-response. But loud noises, they go on to state, *will produce* the reaction of fear. This form of stimulation presumably evokes not only the reflex adjustment of the sense-organ in primary attention but also the specific response of the gross musculature and of the glands involved in fear. It would be but a statement of the obvious

⁵ Watson, J. B., and Morgan, J. J. B.: "Emotional Reaction and Psychological Experimentation," *American Journal of Psychology*, xxviii, 1917, pp. 163-174.

to emphasize the fact that the stimuli for the first reactions of the child are of the unlearned type. But it is quite another matter to point out that the perceptions involved in these reactions probably are not at all of the complex objects of adults, but rather sensory presentations of a relatively simple sort, such as the characteristic odor given off by the enemy or by the young or by other members of the species.

Whatever therefore evokes an immediate, untutored reaction of the organism, emotional or otherwise, either in the form in which the sense-organ is adjusted to the stimulus, as in the case of the light, or in the form of a more complex reaction of the organism as in fear, may become also the condition for the rise of a characteristic organization of mental processes of the type which we have designated as primary attention in which the sensations evoked by the stimuli occupy a single focus in the mental field. In the earliest stages of development this type of attention of the 'unconditioned reflex' variety prevails. The interest that attaches to objects at this stage—their compellingness, and their sufficiency for attention—Drever, in a recent study, has denominated "instinct-interest."⁶ He speaks of the "worthwhileness" that accrues to such objects on the mental side. Following James, we might try to clinch this aspect of experience in some such terms as the 'this-object-of-course' feeling which would arise as the object enters, for the very first time, the focus of attention. For 'worthwhileness' would hardly characterize our experience when the original stimulus that causes our hair to stand on end and our faces to blanch, is envisaged for the first time. The term 'compellingness' would better designate the universal characteristic of such 'originally' interesting objects, for it will apply equally well to objects to which we respond

⁶ Drever, James: *Instinct in Man*, Cambridge, 1917, p. 89.

negatively by shrinking and disgust, and to objects to which we respond positively by approach, etc.

We are not now concerned with the question of the bodily basis for this aspect which characterizes experience when the adequate stimulus for the release of an inherited action-tendency is presented for the first time; but only with the fact that the envisagement of the object which releases the original untutored response tends to be accompanied on the mental side by a peculiar *Bewusstseinslage*, an awareness of 'compellingness,' a this-object-of-course feeling. The presence of this feeling in this setting is to be distinguished from its presence in later stages in which the sensory and imaginal complexes attended to have back of them a history of training. In the process of training, new associative connections have become established between the organism's reaction-system and all sorts of objects which finally come to have attached to them this same feeling of compellingness. Just as that side of the street which we habitually take in walking to our place of business comes to be integrated with the *Bewusstseinslage*, 'this-side-of-course,' so too the sensory complex that releases the original untutored responses is supposed to possess this same compellingness, this same 'of-course-ness' feeling,—and that *without a preliminary process of habituation*, the very first time the stimulus is reacted to.

Now whatever form religious experience may take, whether the emphasis appears in an organization of action-tendencies or of affective processes or of meanings—and whatever the mental processes may be that carry the 'revelation' or 'intimation' or 'intuition' at the focus of attention,—whether these processes be sensory as in the case of the experience induced by Tennyson's "flower in the crannied wall," or imaginal as in the case of some remembered platitude that suddenly becomes illumined, for

the person, by marvelous meaning giving an insight into the very heart of reality,—always there is reported the *Bewusstseinslage* or feeling which gives to the experience that 'authoritativeness' that psychologists have been wont to ascribe to the experience of the original, untutored, reflex behavior-tendencies. "There was a hint, a thrill, a summons faint yet absolute," says the poet, and in writing about the ineffable revelation, caught while gazing at the western sky, he speaks of its compellingness, its authentic power.⁷

The point is that, as a matter of fact, the factor of faith in first-hand religious experience is all of a piece with the certainty and compellingness that enters into the experience arising in connection with the envisagement of the adequate stimulus that releases some major action-system; and the 'interest' that attaches to the object envisaged in the 'revelation,' or intuition, or idea, that stands at the focus of attention has the same 'immediacy' as the interest that attaches to the vision of the beloved in the experience of the lover as his attention lights upon the object of his love for the first time. The 'authority' of the revelation, its compellingness, accrues to it in part by reason of the fact that it alone occupies the field of attention that is unified about a single focus; there are no competing objects or ideas. And it has come in under conditions when the organism is physiologically set for the pleasurable reaction. In so far, therefore, as the entire complex experience is characterized by a uniqueness of organization on the psychological side, involving (i) a thrill of unexampled joy, (ii) a high degree of vividness, (iii) the satisfying elimination of conflict and (iv) a unification of attention, it partakes of all the marks of a *first* experience that, like the youth's first love, *is grounded in a complex of physiological reactions of the original, un-*

⁷ Vide: *The Oxford Book of English Mystical Verse*, Oxford, 1917, p. 338.

learned sort, involving the organization of many visceral reflexes basic to the hedonic or pleasure set; and hence its object also, like that of youthful love, comes to partake likewise of the same 'compellingness.' The analysis throws light on the question of the source of the authoritativeness that accrues to the object given in the religious experience, as well as on the psychological and physiological ground for the attitude of faith. Whatever the object may be that is integrated in this setting of basic organic reflexes, it becomes as firmly organized into the totality of the experience as is the image of the particular beloved in the experience of the young lover: 'This one, and no other.'

The second fact with reference to attention in the religious experience, is that consciousness at such moments is characterized by a higher *level of clearness*. Indeed, since the days of Plotinus, the affirmation in one form or another, that consciousness becomes more vivid, or more 'intense,' at those moments when a preceding deadlock of impulses or conflicts of desire is replaced by some sort of unification,—this affirmation has to many of those who have travelled the 'ways that are inward' and have left records of the quest, appeared to be its chief mark psychologically.

It was Geissler^s who first attempted systematically to determine different levels of clearness in the conscious cross-section and found that sensations from various sense-departments occurring simultaneously or in immediate succession may have assigned to them varying degrees of clearness. And also it is noted that the presence or absence of certain auxiliary sensations may have the

^s Geissler, L. R.: "The Measurement of Attention," *American Journal of Psychology*, xx, 1909, pp. 473-529. *Vide also*: Rogers, A. S.: "An Analytic Study of Visual Perception," *American Journal of Psychology*, xxviii, 1917, pp. 558 ff.

effect either of raising or lowering the level of clearness of the sensations in the focus of attention—depending upon the mode of integration.

Now it is just such general heightening of vividness, technically called 'clearness,' that characterizes 'conversion,' the entrance into the *Vita Nuova*, the rise of the 'beatific vision,'—an experience of many names, but presenting nevertheless certain fairly constant and regular psychological features. "It has the Rembrandt quality," writes one, "but whereas he threw his light on just one part of the picture, making that part vital, leaving the rest in darkness, this light illumined everything and everybody, leaving nothing in darkness. It was the Rembrandt quality a thousandfold intensified."⁹ It is an artist's account and he chooses his simile well for making the point that the whole of experience comes to partake, for a while, of a higher degree of clearness. In the following account we have a certain degree of psychological sophistication entering in, in a way that prevents the person from losing balance, and keeps him fairly close to the level of description. "I saw no new thing," writes one (here there are no hallucinations, at any rate), "but I saw all the usual things in a miraculous new light. . . . I cannot say what the mysterious change was. . . . Every human being that moved across the porch, every sparrow that flew, every branch tossing in the wind, was caught in and was a part of the whole mad ecstasy of loveliness, of joy, of importance, of intoxication of life."¹⁰

That the emotional setting of the experience serves to enhance the vividness of the conscious moment as a whole and of its constitutive sensory and imaginal processes, there can be no doubt. The concomitant stimulations arising within the characteristic pattern of physiological

⁹ Montague, M. P.: *Twenty Minutes of Reality*, New York, 1917, p. 67.

¹⁰ Montague, M. P.: *ibid.*, p. 9.

processes peculiar to different emotions give rise to organic sensations of visceral origin that are repeatedly described, often in great detail, in many accounts of religious experience. This visceral stimulation may serve, at times, to heighten the vividness or clearness of the stimulations arising from the activity of the organs of special sense. Thus James Macbeth, already quoted, writes:

It affects my body first in the brain which actually I felt to quiver as with delight. It descended by my spine where it seemed to burn like living fire until it possessed the whole nerve body which literally thrilled with the joy of life. This state lasted usually about an hour, and I knew that I was then in touch with something beyond the mundane. For though my normal consciousness was much withdrawn, during the rapture, from the ordinary mode of comprehension, nothing of what happened around me escaped my notice. Indeed, my powers of seeing and hearing, etc., were intensified. The grasses smelled more sweetly to me, the birds sang more clearly, and the contours of the leaves of the trees, and the forms of these creatures were more intense in their beauty. These experiences, indeed, filled me with a new power of life, for I now could think and speak and write more clearly and easily than heretofore.¹¹

Apart from the possibility of a specific effect upon the nervous system that might, indeed, be caused by a change in the chemical balance of internal secretions released under these conditions, this stimulation entering the nervous system functioned directly in raising the clearness-level of the mental processes at the focus of attention on the principle of the augmentative effect of such auxiliary concomitant stimulation.

And this vividness that belongs to experience in many of the 'conversions' that are not simply an orgiastic release of automatisms, may continue as a psychological

¹¹ Macbeth, James: *The Brotherhood of Healers*, Chicago, no date.

sign of a more or less abiding change in the physiological tuning of the organism. Though the original vividness disappear, yet, since the days of Plotinus, account after account bears witness to a change of consciousness in this respect, as a psychological fact, quite apart from, and over and above, the changing content on the ideational side. And the heightening of clearness or vividness of consciousness tends to continue in some measure even after the initial experience. This increase in 'brilliance' of the mental processes, this vividness accruing to the whole of consciousness is repeatedly reported also by those who have systematically undertaken longer fasts from motives other than religious—and this throws some light upon the use of fasting as an element in the traditional technique prescribed for those who in another age have sought the systematic cultivation of the religious life.¹²

The third item in connection with the problem of the attentive state in religious experience that we would point to is one bearing upon the occasional occurrence of *hyperæsthesias* and *anæsthesias*.

For if the general heightening of consciousness which we have just described is a characteristic of religious experience, we must also note that often there are certain anomalies of attention which in many cases border close upon, or fall within the realm of, the markedly abnormal. The accounts of religious experience abound in histories of cases in which anæsthesias, hyperæsthesias, and hallucinations occur repeatedly. The anæsthesias of Hindu ascetics and of Christian saints need only be mentioned here; likewise the various types of hyperæsthesia, visual,

¹² The results of contemporary studies on fasting bear directly upon the question of the part played by organic tuning in the religious experience, and more particularly upon the part played by the functions involved in the anabolic processes.

auditory and tactual, which are abundantly mentioned in the case-histories. These are but special instances of the phenomena of the raising and lowering of the threshold for the attentive reaction which in their most marked form may be artificially induced in hypnosis and occur as pathological phenomena in hysteria. And finally, the flavor of objectivity that may accrue to imagery that captures the focus of consciousness may give rise to many forms of hallucinations which may persist more or less tenaciously, depending upon the intelligence and the bodily vigor of the subject.

Not all persons possess that degree of psychological perspicacity which enables them to maintain that attitude of objectivity over against unusual experiences which is indicated in the case cited above, where an individual reports that he saw no new thing, but all the usual things in a new light. And again, among those who accept the brain-born image as partaking of the character of the real, not all possess the good sense to proceed as Luther is reported to have done: "Another time in the night, I heard above my cell walking in the cloister, but as I knew it was the Devil, I paid no attention to him and went to sleep."¹⁸ This hallucination, it would appear, was unable to interfere to any marked extent with the normal physiological processes of so well set up an organism as that of Martin Luther.

Anomalies of sensation and imagination, then, are frequently noted in connection with the religious life. But these anomalies are, physiologically, but special developments of a general modification of experience with respect to the attribute of vividness or of clearness of mental processes. That the general raising of the clearness-level that appears to characterize consciousness in the case of

¹⁸ Burr, A. B.: *Religious Confessions and Confessants*, New York, 1914, p. 222.

many 'conversions,' as compared with the general level of consciousness preceding the experience, necessarily involves also a predisposition for anomalies such as hyperæsthesias or anæsthesias, is not at all certain, however. The extreme form of disassociation between the different items appearing in high-level foreground and those in the low-level background, that is characteristic of hypnotic conditions, is discoverable in some of the cases of 'conversion,' but certainly not in all.

Experimental evidence points in the direction that individuals differ with reference to typical organization of the attentive consciousness. There are those of the 'two-level' type; for these the processes going on possess either the high level of clearness belonging to the 'foreground' or the low level of clearness belonging to the 'background.' Then there are individuals of the multi-level type, in whom the sensory and imaginal processes that enter into the mental life at any one moment may belong to many different levels of clearness. It would remain to be determined whether under conditions of 'conversion' the first of these types would tend to show the phenomena of disassociation as does the hypnotic subject, while the other, the multi-level type, would tend toward a greater degree of integration of the mental processes that possess many degrees of clearness. This, however, is merely suggested in our attempts to understand some of the differences to be found to exist between the scholar Erasmus, who was capable of keeping many elements of experience within call, and the active reformer, Luther, whose life gives evidence of another type of mental organization, *viz.*, that of a disassociation between foreground and background that is characteristic of hypnoidal and hallucinatory states. If the life of Luther shows balance, this balance appears to have been that of a

healthy animal organism, a balance very different from that which we discern in the case of Erasmus.

The biologically successful human animal is distinguished in part by a certain insensibility with reference to such matter of fact as would release reactions at variance with the dominant purposes. Such insensibility is conducive to forthright action, unhampered by inhibitory neural impulses arising from too extensive an apprehension of matter of fact in general or of possibilities of evaluation and responses which tend to favor reflection rather than action.¹⁴

These considerations possess other bearings than the parallelism with abnormal phenomena—a parallelism that too often obscures, even for the psychologist, the possible significance of the physiological mechanisms involved. Such a tendency toward an unusual heightening or lowering of the threshold for certain forms or classes of stimulation favors the organization of the new behavior-system, and quite apart from what use, desirable or undesirable, the social *milieu* may make of this factor,

¹⁴ This is the psychophysiological ground for Freud's findings that it is the imperfectly 'submerged' tendencies that cause havoc. In the course of the normal development of the individual certain stimuli, certain envisagements of matter of fact, certain evaluations, certain behavior-tendencies, are favored, and certain others, once active or potentially prepared for, tend to drop out. These latter, such as the interests and behavior-tendencies of childhood, for instance, when they are thus left behind by the adult, are said to be 'repressed.' When this 'repression' is imperfect, there results a variation from the norm. The imperfectly 'repressed' tendency will crop out here and there in action, in feeling-attitudes, in the objects on which attention lights, and in the train of associative processes. In the 'normal,' on the other hand, the submergence may be so complete that there may result a certain insensibility, and a certain incapacity for appreciation, with reference to items that may have been once connected with the submerged tendencies. This phenomenon of 'repression,' in pathological cases, may take on the form of anæsthesia with reference to a whole sense-mode (*e.g.*, cutaneous sensation) or for certain portions of a sensory field, or for certain forms of stimulus. In physiological terms, such repressions are cases of rise in threshold. And in the religious experience, we see, there may be this same phenomenon of a rise of threshold for some stimuli and of a lowering for others.

it plays an important part in the development of the individual, and, as one discovers when one considers the volitional aspect of the religious life, it is a factor which enters into the psychophysical mechanisms for the control of experience on the part of the individual. It was James¹⁵ who singled out this function and constituted it the central item in his conception of the *will to believe*. This factor, so frequently cited merely as a mark of abnormality, plays at times an important part in processes of reorganization, both on the side of mental and on the side of bodily functioning. This throws light not only on the apparent anæsthesias of martyrs burning at the stake and singing hymns of praise with their very last breath, but also it indicates the mechanisms by which the individual is aided in his achievement of voluntary control over his own destiny. And not all such control need involve such distortion of objective fact like that which was pointed to in connection with the fable of Æsop's fox. As the individual grows in knowledge of the 'ways that are inward,' he becomes increasingly surer in his judgment of the nature of the connection between some symbol, idea, stimulus, and the reactive tendency—and knowing these he may become master of the keys in the spiritual household, if not the master of the house.

In summary: the organization of neural processes with reference to the focus or foci of attention, the raising of the clearness-level of mental processes, and the phenomena, bordering on the pathological, of greatly raised or lowered sensory thresholds—these constitute distinguishing features of the religious awakening. For with respect to the psychology of attention, the central fact in the experience is a moment in which secondary attention with its several conflicting foci—each representing a stimulus for some specific response, and exerting a cer-

¹⁵ James, William: *The Will to Believe*, New York, 1897.

tain amount of inhibition upon the action-tendencies belonging to the other foci—is replaced by primary attention with its single focus and with its accompanying feeling of compellingness and authoritativeness characteristic of moments when the questioning reflective attitudes of secondary attention are in abeyance. Also, the increased vividness that accrues to experience becomes the occasion for the rise of a new attitude in which attention comes to be directed upon mental processes themselves—upon their rise, their organization, their course and their subsidence. Indeed it is this item that constitutes the individual's 'awakening' to the fact that he is, among other things, an *experiencing* individual. Likewise, though not so readily, the fact of the raising and lowering of sensory thresholds may reveal a principle that, extended to the field of ideational attention, might operate, as James's "will to believe," in making the individual, as was just said above, master of the keys in the spiritual household.

XVIII.

KNOWLEDGE AND THE RELIGIOUS LIFE

ONE of the oldest problems with reference to the nature of religious experience is the one concerning the place occupied in it by meaning, ideation, and thought. Since the time of Plato, at least, philosophers have attempted in some way to give a statement of the psychological mechanism by which the objects of religious knowledge were apprehended in individual experience. It lies outside the purpose of a psychological analysis to give a detailed history of philosophy's dealing with the problem; but it is noteworthy that it is in Plato rather than in the philosophy of the Enlightenment that we find one of the best attempts at a psychological statement of the way in which the 'soul' comes to 'know' the Absolute, the Universal Light, under the form of beauty.

We have quoted elsewhere¹ part of the famous passage from Plato that continues to be one of the treasures of the Western world.² It is cast in the form of an instruction for those who would follow the path that is to span the chasm between man and the world of Celestial Beauty. Its very simplicity may cause one to smile; yet closer scrutiny reveals that it is a most carefully formulated description of a psychological technique. If a divagation, not irrelevant to our interest, be permitted, the reader's attention may be called to the possibility of noticing a certain similarity of style in the Greek sage's description and the account of an inward change given by the woman of the Middle West, cited in our discussion of the emotional antecedents of religious experience. It is the similarity of simplicity of statement in a field where that is difficult indeed to achieve. Plato leaves the realm of

¹ Page 117.

² *Vide* the *Symposium*; also the *Phædrus* and the *Protagoras*.

speculation, and in the instruction it becomes clear that here he is not concerned with metaphysics but with a program of change in the functioning of the psychophysiological organism. It is a program describing the processes by which one presumably may enter into the "single science of beauty everywhere."

The program is outlined in terms of the successive attachment of the æsthetic response to different types of stimulus. "If he be guided rightly"—so begins the instruction—the neophyte will be led to respond at first to the perception of some particular sensory object, then "to all fair forms," that is, to a class of stimulus-complexes, then to ideas and thoughts of objects, and finally to the concept of Beauty itself, by "drawing towards the sea of beauty, and creating and beholding many fair and noble thoughts in boundless love of wisdom, until at length he grows and waxes strong, and at last there is revealed to him a single science of beauty everywhere. For he who has been instructed thus far, . . . will suddenly perceive a nature of wondrous beauty, . . . beauty only, absolute."

The famous passage from the *Symposium* has been one of the most influential in the more recondite paths of Western culture. For those traveling the less frequented ways of the religious quest, it has sometimes furnished the model for specific instructions that have served in a way in which the general statements of the canonical literature do not; and its value has lain in its offering a psychological, yes, even a psychophysiological or behavioristic, technique for reaching an objective, instead of functioning merely in keeping alive the hope that the goal might possibly be achieved. Not to philosophers alone, or to poets, but more particularly also to those who have individually elected the life of sanctity, and have made progress therein, has Plato here been a guide.

No description exemplifies so well as Plato's the place

that perception, ideation, and thought have in the religious experience. The part they play here is twofold. It is clear that first of all they supply *the cues for the release of the æsthetic response*,—beginning with the perception involved in the first untutored response, passing on to the ‘conditioned’ release by way of the established associations in idea, until in some way a stage is reached in which the response is elicited in general by ‘all beautiful forms, notions and thoughts.’ And secondly, perceptions and ideas are organized into the ‘knowledge,’ the ‘science,’ that is achieved and that constitutes, in part, *the meaning* of the state attained.

Psychologically, however, the *meaning* that is given in the process of knowing here achieved, is carried in part by the æsthetic emotion itself, in an affective reaction first called out as an unconditioned reflex by the biologically determined original stimulus, *i.e.*, by the object of the youth’s first love. We are here reminded of the function of giving meaning that is served by the affective processes in sense-feelings and emotions as ‘contexts’ of the perceptual and ideational complexes. Hunter³ has pointed out that the second member of an association may be a sensation reflexly aroused; psychologically this latter sensation constitutes context that gives ‘meaning’ to the first. So here the æsthetic response, as an organic reaction, is released reflexly along with the perception or idea, and thus functions in giving meaning to the perceptual or ideational complex at the focus of mind.

Such an analysis, which discovers in the organic processes the carrier of *meaning* in this type of experience, does not in any sense dispose of its significance. Indeed the analysis may open up an avenue of fruitful interpretation and hypothesis.

³ Hunter, W. S.: “A Reformulation of the Laws of Association,” *Psychological Review*, xxiv, 1917, pp. 188 ff.

For it is at the point of this item of meaning that there arises one of the distinctions between the scientific and the religious attitudes. The two have in common that they both involve a holding up of the direct reflex responses and a substitution of the attention-response. Both attitudes involve also the increase in clearness of mental processes favored in the suspension of overt behavior. But the two differ with respect to the type of attentional attitude and with respect to the type of object that is given at the focus in perception and idea.

In tracing the development of the scientific attitude in its humble beginnings in biologically determined behavior, we saw that there is not only the reflex inhibition of the overt action and the reflex adjustment of the sense-organ, but also there are further reflex movements that result in favoring sensory stimulation by way of the organs of special sense located at the periphery of the body, thus favoring in turn the rise of further sensations under conditions of attentional clearness. This behavior fosters apprehension of objects by way of the organs of special sense, and the organization of perceptions in terms of associative processes that again depend directly upon the stimulation of the special sense-organs—principally those of vision and audition. Consequently, under conditions of the functioning of the scientific attitude, the object that is envisaged at the focus of attention is given primarily in perceptions constituted of sensory and ideational processes deriving from the stimulation of organs of special sense, *apart from the affective reaction of the organism*. Not so in the religious experience. Here the object that is envisaged is given in terms of perceptions and ideas organized in a setting of affective items, of feelings and emotions, indicative of wide-spread organic reactions. These affective processes contribute a great part of the context or meaning in the religious experience.

Hence the distinction between the type of objects in the scientific and in the religious attitude. The one tends to give the object apart from the feelings and emotions that it might arouse in the individual; the other may give the object *in terms of those feelings and emotions*.

Thus it is that in the religious experience it is not the environing 'physical' world that is given in perception, but that world transfigured by the changed organic reactions of the individual. "Passing through a patch of beggar's grass, . . . with its wiry stems, ending in feathery heads,—every head shone and glistened like pearls. I could hardly walk for the overwhelming sense of the Divine Presence, and its joy."⁴ Also Masfield, who gives a more detailed description of the objects of the common world, thus transfigured:

O glory of the lighted mind.
 How dead I'd been, how dumb, how blind,
 The station brook, to my new eyes,
 Was babbling out of Paradise,
 The waters rushing from the rain
 Were singing Christ has risen again.
 I thought all earthly creatures knelt
 From rapture of the joy I felt.
 The narrow station-wall's brick ledge,
 The wild hop withering in the hedge,
 The lights in huntsman's upper story
 Were parts of an eternal glory,
 Were God's eternal garden flowers.
 I stood in bliss at this for hours.

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The dawn with glittering on the grasses,
 The dawn which . . . never passes.⁵

⁴ Montague, M. P.: *Twenty Minutes of Reality*, New York, 1917, p. 20.

⁵ John Masfield: *The Everlasting Mercy*, New York, 1912, pp. 78-79.

The aura of new meanings, the new 'light' which is shed upon the object of attention, is thus the reflection of the changed attitudes and behavior-tendencies that are involved in the experience; and not always need this new significance or meaning constitute a distortion as did the fox's judgment concerning the grapes. And just as the sensations and images of special sense serve to indicate for us the nature of the grapes, so the sense-feelings that may become the carriers of such auras of meaning in religious illuminations or awakenings, may serve to indicate the nature of the manifold that constitutes the source of our values, wishes, desires, attitudes, purposes, volitions. And this manifold of the 'interior life' need not be given in the individual experience solely in terms of the sensory and imaginal complexes of auditory and tactual and thermal sensations, but by the associated qualities belonging to the various sense-feelings of organic origin, such as the thrill that is felt "at many a faintest breath or stir of sound"—as 'twere a "rill of joy" traversing the body.

It is no new thing to affirm that in the religious experience there may be the occasion for the discovery of this 'inner' world, and that in the reports of high moments of 'awakening' or 'illumination,' there are sometimes intimations of such discovery. But when thus stated, the implication is often that something has been destroyed, or lost, or neglected in the statement. Perhaps, yes. But, on the other hand, the simple psychophysiological statement holds implications of a vital sort. For unless we assume that there is nothing significant for our destiny in our biological equipment and functions, the facts concerning these processes, both on the side of body and on the side of mind, may become in themselves the starting point for a type of growth in some respects similar to that apparently aimed at in the technique of Plato which was analyzed above.

In the light of what is known of the interrelations of physiological processes that are basic to our attitudes, behavior-tendencies, and our active purposes, it has become clear that these processes possess a certain 'dialectic' or logic of their own. It is this that the researches of physiology and psychology are bringing to light. Some of these relationships were intimated in earlier chapters. Decisions and judgments are not always primarily conditioned by nervous processes but by metabolism and by the chemical tuning of the organism. Even in the organism whose life is controlled by the 'original' basic pattern of these interrelated processes, this fundamental dialectic of attitudes reveals a greater complexity than might appear to superficial observation. And within this fundamental pattern further differentiation and variation is possible.

Under circumstances when there is a lull, when for a moment the dominant processes are still, it may be—that is one of the implications—it may be that new shifts and emphases may arise, not lawlessly, but entirely in accord with physiological principle; yes, it may be also—and that too is one of the implications—that whole neuroglandular mechanisms and the pattern of metabolic balance that depends upon them may suddenly be given an opportunity to function, as is the case with the mechanism of joy that is sometimes suddenly released in the organisms of fear-ridden, pent-up men and women at the very moment when, harassed by they know not what, they judge themselves to have been driven back to the brink of some abyss; and it may be—though here one must be understood to speak already of more remote implications—it may be that, as there are within the animal organism rudimentary anatomical structures just barely indicated which only by reason of a position homologous to functioning structures similarly located in other organisms,

are inferentially designated as rudimentary organs, so the possibility is not to be excluded by ourselves, in the light of the evolutionary hypothesis, any more than was the possibility of new sensory structures excluded by Tyndall in a species as superior to man as man is superior to the iguanodon, of another type of structure developing in the human organism with attendant functional modifications, in directions not now guessed, with accompanying modifications of experience on the side of mind. And what do these implications signify?—from the first one which must be considered as *actually* implicit not merely in the logical sense of being implied in a hypothesis but in a physiological sense as being laid down in the constitution of the body, to the last one which already is more remote, yet less so than Tyndall's anticipation of new sensory structures developing for the apprehension of the now non-visible rays. This: they point to the richness of the actual dialectic of these processes that might be reflected in experience if they had a chance, and thus become 'known' in the individual. They point to possibilities of character-development which would be reflected in experience in terms of a new patterning of these affective items in mind. And they point, hypothetically, to new, now 'unknown' patterns of organization.

Stated thus, there is here room for the 'science,' 'knowledge,' of which Plato speaks, that was sought by Plotinus and the neo-Platonists and by the Christian saints in the centuries after them. It is a 'knowledge' that may perhaps be difficult to put into words, but if developed and tried out in the individual, it may ultimately be found to stand the test of being an instrument of control, a control of the psychophysiological functions which lie at the root of character and personality, and are the determiners not only of the attitudes and purposes of the indi-

vidual but also of the content of experience. And so far as such control is possible, its processes must lend themselves to analysis in terms of the psychological and physiological conceptions that are current in our day.

XIX.

THE CONTROL OF PSYCHOPHYSIOLOGICAL PROCESSES

THE annals of the religious life bear witness to the fact that it often has upon it the marks of strenuous endeavor. We have analyzed its affective, or emotional, aspects—especially as they may appear in their more marked forms in crisis-situations. We have analyzed the experience also with respect to its attentional aspects and noted how in it the many foci of attention, characteristic of conflict of impulses, desires, and purposes, are replaced by a unified state of mind, indicating a resolution of conflicts and an organization of the individual's interests and action-tendencies into some sort of whole. And in the last chapter we noted that the religious experience offers a significant problem from the point of view of the psychology of the cognitive functions in that there may be given to the individual, in this experience, an intimate knowledge of the life of impulse and desire, of motive and of purpose, an insight into his own nature often wholly new to one whose attention may have been hitherto directed chiefly to outward things in the pursuits of love or craftsmanship or in business enterprise.

But if the religious experience presents problems in the psychology of emotion, of attention and of cognition, it may be approached also from the side of the psychology of volition and control. Indeed, it is apparent that the psychological processes of ideation and perception function here, as in all experience, after a twofold manner: they become not only the carriers of the *meanings* that constitute knowledge, but they become also the *cues* for the release of specific attitudes and action-tendencies. For

the discovery of the inner world of attitudes and desires, of feeling and action-trends, that may be 'revealed' in the religious life, carrying perhaps also intimations of what seem to the individual new modes of experience or new possibilities in the way of conscious attitudes, is not only a cognitive affair but may be volitional as well, in that it keys the individual first in the direction of efforts toward recapturing the supreme moment, and, secondly, in the direction of endeavors to develop the attitudes that seem to him earnest of possible realization of the vague yet challenging vision of worlds-to-be.

The person may come forth from the experience "drenched with the greatness and the bitterness of the quest." For the time other objectives pale for him. Indeed, he may be caught as the lover is caught by his objective. Hence the feeling of 'compellingness,' of authoritativeness, that sometimes attaches to the experience or to the direction of quest. And if there is a movement of attempted escape, this 'compellingness' may give way to a conviction such as that limned for us by Thompson in "The Hound of Heaven." But whether he flee from it or seek it, there abide with him vague memories, vestiges of feeling and of organic attitudes, that function in keeping him keyed in an endeavor to reinstate the experience, if possible, by their means, or, in isolated cases, even to elaborate, as is indicated in Plato, a technique of control.

Now the essence of control of behavior, whether by society or by the individual himself, is the utilization of the available connections in the nervous system, either original or acquired, between certain forms of stimulus and response. The simplest illustration is the connection in a dog's nervous system between the sound of his master's voice and its reaction of running toward him. In the human nervous system a similar, though more elaborate, mechanism is involved when the mere description of the

strawberry shortcake functions as the stimulus that elicits an increased salivary secretion. In so far as we know what kind of response, in the way of outward action or of organic process, has come to be associated, either 'originally,' *i.e.*, by nature, or through training, with some particular stimulus, we are given just that measure of control over our experience and our behavior. The enthusiastic writer in the *Atlantic Monthly*, from whom we quoted, had discovered that the physiological processes which determine our attitudes, may be thus controlled by focusing attention on certain objects or, in his case, ideas to which the physiological reactions have become attached—ideas such as "The Lord is my Shepherd," and "I shall not want." Any idea that is thus incorporated as part of some experience involving subtle attitudes, may function in reinstating the experience and the attitudes belonging to it.

Not always, however, is this cue for the release of the reaction constituted by such an ideational core referring to some external object or to some situation; the response may be set agoing also by the thought of some part of the response itself. To illustrate: the thought of the strawberry shortcake may release the salivary flow; but this salivary reaction may, in some instances, be set off by focusing attention upon the inner cheek or upon the feel of the saliva in the mouth. Indeed, the individual who anticipates 'in idea' the probability that he will blush or that some other organic reflex will presently go off, may find that as soon as attention envisages the possibility of the reaction, the reaction appears. If one falls completely under the hypnotic suggestion that on the morrow one is going to spill a glass of water at the dinner party, or if one expects to be unable to swallow one's food in the presence of some august person, the anticipated action, or inhibition of action, tends to occur. So remarkable did this

fact appear in the last quarter of the nineteenth century, that entire systems of psychology and of healing came to be built upon it. Over-emphasis and distortion of the underlying principle of efferent nervous discharge has led to extravagances of interpretation not only among the laity, particularly among the devotees of many of the modern religio-medical and prosperity cults, but also among professional psychologists, especially among those interested in 'applications.'

But apart from these extravagances, the fact remains that control of experience and of our behavior becomes possible only when we know what sensation, perception, idea, posture or movement has become, in the individual nervous organization, the cue that tends to release the organic process or set basic to some particular attitude or behavior-tendency.

Control becomes still more certain, however, when we know not only the usual stimulus for a given response, but also the *general* environmental and physiological conditions that tend to raise or lower the threshold for its release. A whimsical, because entirely useless, association between stimulus and response may serve to illustrate. During a serious illness a child had been obliged to take a nauseating medicine. His willing coöperation was secured by giving him a dime for each imbibing. And to make the ordeal less trying, there was administered after each draught of the potion a mouthful of black coffee, intended to allay the rising nausea-reaction. It so happened that this repeated procedure served to establish an association in the nervous system between the taste and smell of warm black coffee and the nausea-reaction—a connection which has remained operative throughout adulthood. When the individual is tired, the odor or taste of warm black coffee serves to release an incipient nausea-response, and sometimes, under conditions of extreme fa-

tigue, the mere thought of the beverage is thus accompanied by a slight nausea. This idiosyncratic association, established in the nervous system between a particular stimulus and a specific visceral reaction, serves well for elucidating the elements of control of organic processes. It illustrates, first of all, the process of grafting a reaction upon a hitherto neutral stimulus;¹ it illustrates also the influence of the general bodily condition upon these reflex functions. The coffee-nausea reaction tends not to be favored equally at all times, but rather when the organism is tired. It is then that this idiosyncratic connection most readily becomes operative. In other words, the organism is not a simple machine whose behavior is dependent solely upon the stimuli presented by the environment. The release of the reflexes and habituated acts that enter as component elements into the organism's behavior-systems is conditioned by such items as metabolic states of the body-cells, by the periodic factors that determine the organic rhythms, and by the temporary set of the nervous system; and control of psychophysiological functions becomes possible in the degree in which not only stimulus but also these contributory determiners are known. In the instances cited, the coffee-nausea reaction might come under control when not only the particular conditioned or acquired stimulus is known but also the fact that it is more readily released under conditions of bodily fatigue; and the increased salivary flow, released by the description of the strawberry shortcake, becomes

¹ In the case of the illustration, the coffee was administered while the reaction of nausea, called out by the medicine, was still in progress. Consequently, when the coffee is given alone, it releases the response as did originally the medicine. This is the principle of the *conditioned reflex*, studied by the Russian physiologist, Pavlov. In the illustration, however, the new, or "conditioned" stimulus is applied not before but after the original "unconditioned" one, the evil-tasting medicine—while Pavlov was at pains to point out that the new stimulus becomes more readily established when, during training, it precedes the original one instead of following it.

more predictable when we take into account the habituated daily rhythm of the alimentary processes,—we can obtain a more pronounced flow, for example, just before the usual mealtime. Such homely instances serve to indicate the nature of the psychophysiological processes involved in a technique of control, and it is apparent that in so far as the individual comes to know the connections, both original and acquired, between stimuli and his own response-mechanisms, and attains an understanding of the bodily conditions which favor or militate against their operation, he is coming into possession of the elements out of which he may develop such a technique.

Now it so happens that the records of the religious experience, laid down in the canonical literatures, in the annals of the life of sanctity, and in the traditions, legends and rumors of the spiritual quest, present to us in many places elaborations of such a technique—elaborations that indicate often a surprising insight into the principles of psychophysiological functioning. It is not the purpose of this essay to offer a sweeping indorsement of the psychological soundness of all that has thus been handed down to us; but it may be pointed out that there is a vast store of such material laid down in race-history, constituting a field virtually untouched by scientific inquiry. Our contemporary world seems often to be so preoccupied with theological and cosmological implications of the ancient ideologies, that it loses sight of the fact that these traditions may offer, besides cosmologies and theologies, suggestions toward a technique of psychophysiological control. In the primary grades there is supplied imagery that may operate as does that of the Twenty-third Psalm in the case of the college professor whom we quoted as discovering anew in the first quarter of the twentieth century the energy-releasing power of the ancient Judaic ideology. In holding forth such imag-

ery, to which certain emotive and attitudinal tendencies, such as joy or hope, are readily attached, the traditional ideology functions simply in aiding in the establishment of desirable conditioned reflexes. The more recondite paths of this quest, however, have led to a number of significant observations bearing upon the psychological and physiological aspects of the control of human experience and behavior. When we consider the intense preoccupation that mankind has brought to the problem, it is not surprising that there are laid down, in the records, statements revealing unusual insight into the psychophysiological functions involved in the life of feeling and attitude; nor is it a matter for surprise that the quest should be in a very real sense an adventure in the control of bodily and mental processes. Yet it is significant that the technique of voluntary control—in spite of its various special formulations in terminologies individual to periods of history and to stages of culture, as in Saint Paul, in Plato, in the Upanishads, in the Book of the Dead, in Lao-tze—is not only uniform so far as references to its psychological and physiological aspects are concerned, but is indeed only an extension of the procedure that characterizes all human behavior the moment there appears the phenomenon of an awareness of the attitudes that constitute personality and character. Apart from the processes of social control which play, as Ames points out,² so large a part in religion in the earlier stages of human culture, there is, in the later stages, an increasing precipitation of knowledge bearing upon the development of personality through self-discipline. Leaving aside all considerations of the source of doctrines such as those of early Christianity, and all their metaphysical implications, it is possible to look upon those doctrines as con-

² Ames, E. S.: *The Psychology of Religious Experience*, Boston and New York, 1910, pp. 33, 49, 73.

taining a technique for an experimental life. Considered in this light, the 'regeneration' into which the Teacher of Galilee asks mankind to follow him becomes a technique of attitudes that may lead to growth in the knowledge of the 'kingdom' that is 'within'—a knowledge which, according to the traditional accounts themselves, involves a changed mode of physiological functioning of the body. And the Transfigured Humanity that is there outlined would be one that is transfigured not alone in mind but in body also. The emphasis which was put—especially by Saint Paul—upon the item of the 'overcoming' of the 'natural' man, and upon the subjugation of the 'body,' is a plain-spoken instruction, better adapted perhaps to the understanding of the less subtle, than is the more analytic statement of technique, couched in psychological terms, of Plato. But the interpretation that for a time came to be placed upon the Christian technique by its devotees, led to austerities³ against the body which it is difficult for us to contemplate with any degree of sympathetic appreciation, whereas the Platonic instruction, more recon-dite, and at the same time more in accord with the Hellenic spirit, gives a less violent and more detailed program for achieving its purpose. The fact is that within the later Christian movement itself, it is Plato's program which, in the early Renaissance, often furnishes the more specified psychological technique to those who essayed this type of quest at a later date. But whether in Pauline doctrine or in Plato, whether in Plotinus or in Marsilio Ficino of the Florentine Academy, the reference at this point is specifically to the technique of achieving differentiation and control of the attitudes, desires, and action-tendencies that enter into personality and character.

³ The immediate occasion for these austerities lay in a large measure in the decline of the amenities in the metropolitan life, and in the hopeless economic situation of the lower orders in the Mediterranean culture of the early centuries of the Christian era.

It may be of interest, moreover, that there are indications that the Eastern Aryan has worked out a similar technique far more systematically than has the West; we refer not to the reputed feats of physiological control like causing the heart to stand still and other such, but to the instruction counseling freedom from desire—in which the One suggests that after the neophyte has brought all desire under control for the sake of the love of Brahm, he may then strive to learn to be complete even without Brahm. If we can refrain from evaluation at this point, we shall be able to see in this the technique of detaching the organic reaction from the stimulus carried almost to its final term of perfection. And in that Eastern Aryan technique there seems furthermore to be absent that utilization of violent emotion that is suggested in the deprecation, on the part of Hellenic Christianity, of the impulses of the 'natural' man, as a means of 'overcoming' them.

The major implications in all these programs, that man may, if he choose, 'remake' himself, by specific procedures, is clear enough; likewise the implication that this remaking is but a propædæutic to an entry into something of the nature of a new order of experience. It is apparent also that the method invoked in all these programs is, throughout, that of establishing and of modifying connections between various stimulus-complexes and the *organic* responses basic to the feelings and attitudes, so that ultimately the individual may, in part, be freed from the 'blind' functioning of these organic processes. Such a physiological change is implied in all those individual cases in which there is an organic shift leading to the type of experience that takes on the pattern often designated as 'religious awakening,' and certain of its fundamental features come to be incorporated into the techniques of all the higher instituted systems.

Yet it is a curious fact that concerning both the proce-

dures and the end to which they are supposed to lead, concerning both propædæutic and goal, the charge of obscurantism is frequently brought by our contemporary world with its naturalistic viewpoint. When, however, we examine these records of human striving, laid down in the history of the race as are those preserved in the great canonical literatures, or precipitated in the course of individual experience like the *Imitatio* of Thomas à Kempis, we discover repeated reference to psychological matter of fact that not only is not obscure but points to a considerable body of relevant empirical information, concerning the psychophysical organism and its modes of functioning—information that anticipates at some points our contemporary scientific knowledge of body and mind. Often, however, such items are barely indicated and in our own day some of those who with distinction have openly borne witness to the viability of the 'way' or have endeavored to limn for us their conception of the 'end' thereof, appreciate the resistance that the usual determining tendencies might possibly offer to the admission even of the possibility of other 'sets,' a resistance somewhat like that analyzed in the discussion of Biologic Finalism. To quote the words of a contemporary, who well combines discretion and entire frankness, writing in a foreword to a poetical work of his: "But such an institution may be taken to indicate that the poem has a different meaning, one, however, which must be left to the discernment of a few readers because it is hostile to the spirit of the age." Such caution on the part of some having in mind perhaps the fate of Paul and Socrates may have some justification on biological grounds. For the issue turns often upon fundamental biological attitudes and to antagonize these might be, even in our own age, inconvenient.

There are, however, two other considerations that may be pertinent at this point of apparent obscurity of state-

ment. One is that experience is always, in essence, individual, and is not really communicable—though certain of its quantitative marks or measurements are transmissible as scientific knowledge claiming a degree of universality. The signs and symbols of language do not transmit the content of experience from one person to another. They serve only to arouse memories of objects and vestiges of attitudes that may prove useful in giving meaning. And when all has been said that the person attempting to communicate can say, it still remains true that unless his words and actions succeed in arousing such memories and vestiges, the communication fails. One born blind will not gather the quality of our visual world, and we who see develop hardly so elaborate an organization of tactual meanings as do the blind. And again, just as certain avenues of the æsthetic life may appear for a time closed for us, so, too, there may be other byways and highways of experience that are untrod by us and therefore furnish forth neither memories nor vestiges that might help us in understanding.⁴

The other consideration that is pertinent at this point is that the thing that stands in the way of understanding is not always obscurantism,—whether it be that of ignorance or of affectation of the mystery-mongers, or that of warrantable caution on the part of those who believe they have something to say—nor is it an utter lack of participation on the part of ourselves, in the experiences and reactions under discussion; it is rather frequently the case that certain inhibitions, growing not necessarily out of some violent emotional reaction, but out of the habituated organization of our intellectual life, interpose themselves. Just as the individual who has had some experi-

⁴ “Hadst thou not found me, thou wouldst not seek me,” is the archaic, yet curiously apt way in which Pascal states the psychological basis for the partial and fleeting participation in such modes of experience.

ence of the nature of a religious awakening that was fraught, for him, with deep significance, may regard with a certain dubiousness the possibility of its dependence upon some 'merely' physiological process or other,—so conversely, when certain facts bearing on the interrelations of various physiological processes are presented, we may miss entirely certain implications for human experience even though they would seem to some to lie nearest the surface. Yet if such implications were grasped, they might give us, perhaps, a new intellectual appreciation of man's place in the universe. For example, the psychological bearing of fasting, which was so frequently recommended in ancient days and which led sometimes to strange austerities, is often completely missed. A carefully guarded, almost wistful, plea for the revival of the practice of fasting was recently made by a leader in Protestantism. He dwells at some length on the value of occasional fasts, and mentions particularly the effect that fasting seems to have upon the mental life. Among other things he discovers that it results in a clarification of consciousness—the same phenomenon of raising the clearness-level of conscious processes that was found characteristic of religious awakening.⁵ Secondly, he discovers that fasting makes possible a control of the "desires of the flesh," as he calls them. This is presumably proposed as preparatory to the practice of certain attitudes which in our contemporary world are but seldom recommended and not less seldom practiced. These things are apparently only a propædæutic to a series of discoveries, one of which seems to be that after a prolonged fast there develops a new attitude and a new discrimination with regard to food. In connection with the second item there are recorded also certain characteristic developments

⁵ *Vide supra*, pp. 154-157.

closely associated with an increased capacity for concentration of attention. This physiological technique of fasting affects, on all the evidence, first of all the mental life in the sense that consciousness becomes more vivid, more awake, if you will; secondly, the associative processes become more nimble; and finally, subtle changes in the life of attitudes are reported to set in generally. About all this, as we have told it here, there is nothing very exciting, although it tallies interestingly with the outcome of the few experimental studies of fasting that have been made in recent years. Yet if fasting limbers up the mental processes on the one hand, and allays the neuro-muscular tensions on the other, we manifestly have physiological conditions which might give a chance for a new mode of psychophysiological functioning; and it might affect not only the individual's perception and judgment, but also his organic reactions and his overt behavior. These implications of our contemporary scientific knowledge of fasting might, if we were so minded, lead us into some sort of intellectual appreciation, if not of the objective of the spiritual quest, at least of the *rationale* of one of the means that have sometimes been proposed for its attainment.

In like manner the traditions under consideration indicate much in the way of concrete knowledge of the factors that condition the affective life. Indeed, he who is so minded may find in Thomas à Kempis a technique for the control of the life of feeling and attitude that reveals a profound insight into the interrelationships of psychological and physiological processes. His instructions to the neophyte, based on the text from the first epistle of John, "Perfect love casteth out fear," might serve as a corrective to some of the things that have been put out under the caption of a dynamic psychology. Let us look

into the possible significance of this text from John. It is only latterly that the possibility of the existence of well-defined anabolic mechanisms operative in certain emotive states is being envisaged psychologically. Since Cannon's studies came out, we have learned much concerning the adrenalistic states such as fear and anger, and concerning their function of mobilizing energy in physiological emergencies. Much was made of the underlying principles, and programs for their application were not lacking. It was soon suggested that the industrial process might utilize anger and fear for releasing energy in the workman—stimulating the one attitude by the device of the pace-setter, the other by holding out the possibility of the 'yellow envelope' containing the notice of dismissal. Much of the envisagement of the psychophysiology of the affective life, growing out of Cannon's findings, is one-sided. It leaves entirely out of account certain important facts mentioned by Cannon⁶ himself. One of these is that the increase in energy-output in the adrenalistic states is not steady but is at the expense of the fundamental anabolic or upbuilding functions. Enough has been said in other connections to make it apparent that there are emotive states of a different sort in which the functions that serve primarily the upbuilding of the body are not thus inhibited but stimulated to a greater activity, thereby making available to the organism a steady supply of energy. We mentioned the case of the working-class mother employed all day in the canning factory and watching all night at the bedside of her injured child through many weeks without visible signs of fatigue. She offers an interesting contrast, in her seemingly stolid 'unexcitability' to many an 'edgy,' hysterical woman of the cultivated classes, who would be wasted utterly by such an ordeal. The seeming stolidity in the simple woman

⁶ *Vide supra*, p. 41, also p. 96.

does not, however, necessarily betoken sensibilities dulled, but, taken together with the measure of work done, it becomes an index of new reservoirs of energy that may be tapped. In thus pointing to a physiological mechanism similar to that of the love released in this mother, which, in its functioning, will not leave the organism worn out as does an adrenalistic state such as fear, the ancient text offers a significant bit of knowledge of an empirical sort. As stated, it is, to be sure, far removed from the ideal of the program of science, which would envisage all experience quantitatively. But the actual reduction of life in terms of quantitative data has been made only at comparatively few points. And in view of the great diversity of the qualitative aspects of human experience, guidance—when guidance is indeed aimed at—with reference to those aspects which have not yet been thus quantified, must necessarily proceed on the basis of such qualitative analyses as are available; and, indeed, whether the objective be *science* or *the good life*, in Aristotle's sense, the initial step in *Empirie* is always the observation of qualitative differences.

But we saw that the Evangelist's statement implies something else besides a qualitative difference between the adrenalistic and the anabolic states: it points to a functional opposition between them. In traditional psychology the existence of a mutual opposition or antagonism between certain feeling-states has long been recognized, but it has never resulted in any very fruitful envisagement of the affective life as a whole, either theoretical or applicational. Not even when latter-day physiology has begun to show the importance of this principle in the realm of muscular reflexes and organic processes, have we awakened to the far-reaching implications which the principle has for an understanding and control of the

emotional processes. We cite this not to make out a case for the psychological acumen of the Evangelist, for he would hardly lay claim to an interest in psychological science as such; but because this intimation of his, concerning the functional opposition of the psychophysiological mechanism of love to that of fear, serves to indicate in what sense the legacy of the life of quest which we have been examining, contains the basis for a psychophysiological discipline grounded in observations of salient facts.

Furthermore, there recurs in all these accounts—in Plato as in the Christian Gospels, in Buddhistic teachings and in neo-Platonic philosophy, in Pauline doctrine and in the Book of the Dead—another distinction of greatest interest: a distinction between two types of love. In the mediæval period and in the early Renaissance it was the distinction between the ‘divine’ and the ‘profane’ love, without the implication, be it remembered, of a stigma attaching to the latter, which is natural affection regulated by law and the social order, whereas the former is wholly a matter of personal election in pursuance of certain ‘counsels of perfection.’ The distinction that is being aimed at is one primarily neither of objects or stimuli, nor of outward behavior, but of emotional quality and feeling-attitude. Also one is led by the contextual descriptions—both psychological and physiological—to the implication that there is involved a difference, at some points, in the underlying organic processes. In this intimation—which we must leave to the reader to discover for himself in these records of human striving—we may see an anticipation of what is even now coming to be known concerning these less accessible processes. Without offering a blanket approval of the various instituted procedures that may have grown out of this distinction, we may yet say that it may, in the future, offer important

amplifications and corrections of current conceptions of the affective life. In anticipation both of physiological and psychological analysis, the distinction points to a clearly anabolic phase of the complex organic reaction involved in love, one favoring the upbuilding of the body, in the literal physiological sense, and to another phase which is just as clearly catabolic, fostering muscular tensions and the expenditure of the reserves of energy. Since the days of Leydig the underlying physiological processes have been known though we tend to ignore the implications of the facts. These two organic processes stand in a relation of mutual opposition to one another—tending to inhibit one another like the antagonistic muscular reflexes of Sherrington:⁷ moreover, at the time the one is thus inhibited, it is being prepared for more intensive action when such inhibition ceases. A survey leads to the realization of how close to the facts were those who described the conflict of the ‘spirit’ with the ‘flesh,’ and who spoke of the regeneration that was the gateway to the *Vita Nuova*. And when, either spontaneously or by reason of voluntary control of attitudes, the ‘regenerative’ phase is maintained at its height over a longer period of time, it means not merely, as in the infra-human world, health and strength of body, a sleeker hairy coat or the growth of bodily structures such as antlers, but, more particularly, on the side of mind it means a facilitation of the associative processes and a distinct intensification and modification of the feeling-attitudes.

In such wise and at such points the traditions and records anticipate our scientific accounts of psychological and physiological processes. And if there attaches to some of these ‘teachings’ in the indicative mode, like “‘Perfect love casteth out fear,” not only this quality of being simple statements of fact, approaching the scientific ideal of

⁷ *Vide supra*, p. 107.

description inviting verification, but also an intimation as of having grown out of a funded insight and a large and wholesome outlook upon the problem of life,—the same may be said of those other teachings, couched in the imperative mode and called sometimes ‘counsels of perfection,’ which address themselves directly to the will. They address themselves to the will, yes; but also they arrest attention by reason of the fact that while they appear to be often contrary to the customary, the ‘natural’ or the ‘normal’ modes of behavior, they yet, at the same time, waken, if not complete conviction, then at least the question whether there may not be ‘something to them after all.’⁸

Take one of those counsels by way of illustration: “Love your enemies,”—a procedure that, on the face of it, is contrary to all the supposedly most deep-seated of the biologically determined attitudes. And yet, contrary to our ‘natural impulses’ though such counsel may seem to be, it is latterly becoming clear that it is, physiologically, money in one’s purse to cease from hating one’s enemy, and doubly profitable, in the same sense, if one can take a friendly feeling-attitude toward him. The counsel is clearly building on a firm physiological basis when it projects a program for the remodeling of the sound biological specimen, the ‘natural’ man of Pauline doctrine, with his inherited reflex tendency to become angry in the presence of his enemy. Taken in their purely outward sense as forms of social behavior, to love one’s enemy, to do good to those who despitefully use you, to offer no resistance, to turn the other cheek—all these are counsels that do not always receive the approval of common sense. We are all familiar with the seeming com-

⁸ The authority that accrues to these counsels may have its rise not solely in some dogmatic imposition from without, but in the dialectic of the physiological processes within ourselves.

promises to which we resort at this point in the name of that common sense in the practical affairs of our domestic, industrial, commercial, and political life. We, the men and women of the Christian centuries, have hitherto avowed a frank admiration for those few characters of history and tradition who have consistently carried on in the sense of that difficult counsel. We may not, wholeheartedly, have gone the way of the Teacher of Galilee, for instance, but, until recently, we have, in our hearts at least, paid this tribute. In all legendry there is no more interesting picture, perhaps, than that of the redoubtable warrior who comes into the presence of his God and offers homage to That which he believes he will never realize, and then returns once more lustily to the conflict. The problems growing out of the counsel in question for our life 'in this world' are brought to a focus in a telling way by a story of the Buddha. Some children one day came across a snake. They moved back, but upon observing that the snake continued quiet, drew nearer. After a while they touched it hesitatingly with a stick. The snake remained quiet and the children grew bold and bolder, finally belaboring the reptile with merciless blows. The Buddha came along and, taking in the situation, requested the children to stop. He asked the snake how it had all come about, and the latter replied that it had heard the Buddha himself on the previous day expounding the doctrine of non-resistance, and had, upon reflection, resolved to put it into practice. And this was the result. The Buddha smiled and said that, to be sure, the snake was quite right in the conviction that the doctrine deprecated striking the children, but this did not imply that any harm would have been done if the snake had hissed a little!⁹ Our pur-

⁹ Something indeed without price may perhaps be slipping from the grasp of our contemporary humanity when instead of the mediæval 'roughneck' who, conscious of his shortcomings, pays homage to that which might be, and

pose here, is only to note the directions whence blow the various winds of doctrine, old and new or seeming-new. But more particularly, we would note that while the doctrine of struggle, subscribed to by the 'children of this world' is both biologically and prudentially the more firmly established, there yet is a physiological warrant for this counsel: the body is poisoned by hatred and its energy is wasted in anger. It is clear that—whatever else their intention—these counsels, in pointing to the control of the catabolic states and to the release of the anabolic reaction, indicate the possibility of 'remaking' the human individual at the physiological center of being—namely, at the point of those organic processes whose functioning determines the life of values and attitudes, of desires and purposes. The instructions may be difficult to put into practice; though not by reason of any lack of specificity, but by reason of the fact that they run counter to the biologically and socially more firmly established modes of action laid down in the instituted life of society.

The case is similar with another group of these 'counsels of perfection,' namely, the recommendations concerning chastity. When we review the outward expressions in behavior and action to which these Pauline recommendations have given rise in the Christian centuries, we tend perhaps to dwell principally upon the austerities of the hermitage, upon the futile self-reproaches of an Augustine, or upon the revolting display of strange forms of self-castigation; and we tend to forget for the moment

instead of the good-natured common sense of the Buddha of our story, we have the patron of higher education denouncing the teacher with pacifistic tendencies as a detestable biological specimen belonging to "the lowest possible form of animal life." The antithesis of the way of the 'world' and of this other way comes to the fore surely in the latter-day emphasis upon the naturalistic doctrine of the function of struggle and conflict in biological selection. Hence a new note in these days in the announcement from high places that the teachings even of a Jesus need to be recast to suit 'modern' conditions!

the more gracious forms of expression in the development of the cult of the Virgin, indicated for us in the ballad of the *jongleur* who, if he could not bring to her service "Latin vocables" would do the only thing he could do—turn a hand-spring!¹⁰ Whether or not our generation

¹⁰ Henry Adams, in his *Mont Saint Michel and Chartres*, gives the following account: "The story is that of a tumbler—tombeor, street-acrobat—who was disgusted with the world, as his class had had a reputation for becoming, and who was fortunate enough to obtain admission into the famous monastery of Clairvaux, where Saint Bernard may have formerly been blessed by the Virgin's presence. Ignorant at best, and especially ignorant of letters, music, and the offices of a religious society, he found himself unable to join in the services:

For he had learned no other thing
Than to tumble, dance and spring:
Leaping and vaulting, that he knew,
But nothing better could he do.

He could not say his prayers by rote;
Not 'Pater Noster'; not a note;
Not 'Ave Mary,' nor the creed;
Nothing to help his soul in need.

Tormented by the sense of his uselessness to the society whose bread he ate without giving a return in service, and afraid of being expelled as a useless member, one day while the bells were calling to mass he hid in the crypt, and in despair began to soliloquize before the Virgin's altar.

'Ha!' said he, 'how I am ashamed!
To sing his part now goes each priest,
And I stand here, a tethered beast,
Who nothing do but browse and feed
And waste the food that others need.
Shall I say nothing, and stand still?
No! by God's mother, but I will!
She shall not think me here for naught;
At least I'll do what I've been taught!
At least I'll serve in my own way
God's mother in her church to-day.
The others serve to pray and sing;
I will serve to leap or spring.'
Then he strips him of his gown,
Lays it on the altar down;
But for himself he takes good care
Not to show his body bare,
But keeps a jacket, soft and thin,
Almost a shirt, to tumble in.
Clothed in this supple woof of maille
His strength and health and form
showed well,
And when his belt is buckled fast,
Toward the Virgin turns at last:
Very humbly makes his prayer;

'Lady!' says he, 'to your care
I commit my soul and frame,
Gentle Virgin, gentle dame,
Do not despise what I shall do,
For I ask only to please you,
To serve you like an honest man,
So help me God, the best I can.
I cannot chant, nor can I read,
But I can show you here instead,
All my best tricks to make you laugh,
And so shall be as though a calf
Should leap and jump before its dam.
Lady, who never yet could blame
Those who serve you well and true,
All that I am, I am for you.'

Then he begins to jump about,
High and low, and in and out,
Straining hard with might and main;
Then falling on his knees again,
Before the image bows his face:
'By your pity! by your grace!
Says he, 'Ha! my gentle queen,
Do not despise my offering!'

tends to disapprove of the former, austere type of behavior as 'repression'—and whether or not it approves

In his earnestness he exerted himself until, at the end of his strength, he lay exhausted and unconscious on the altar steps. Pleased with his own exhibition, and satisfied that the Virgin was equally pleased, he continued these devotions every day, until at last his constant and singular absence from the regular services attracted the curiosity of a monk, who kept watch on him and reported his eccentric exercise to the Abbot.

The mediæval monasteries seem to have been gently administered. Indeed, this has been the chief reproach on them, and the excuse for robbing them for the benefit of a more energetic crown and nobility who tolerated no beggars or idleness but their own; at least, it is safe to say that few well-regulated and economically administered modern charities would have the patience of the Abbot of Clairvaux, who, instead of calling up the weak-minded tombor and sending him back to the world to earn a living by his profession, went with his informant to the crypt, to see for himself what the strange report meant. We have seen at Chartres what a crypt may be, and how easily one might hide in its shadows while mass is said at the altars. The Abbot and his informant hid themselves behind a column in the shadow, and watched the whole performance to its end when the exhausted tumbler dropped unconscious and drenched with perspiration on the steps of the altar, with the words:

'Lady!' says he, 'no more I can,
But truly I'll come back again!'

You can imagine the dum crypt; the tumbler lying unconscious beneath the image of the Virgin; the Abbot peering out from the shadow of the column, and wondering what sort of discipline he could inflict for this unforeseen infraction of rule; when suddenly, before he could decide what next to do, the vault above the altar, of its own accord, opened:

The Abbot strains his eyes to see,
And, from the vaulting, suddenly,
A lady steps,—so glorious,—
Beyond all thought so precious,—
Her robes so rich, so nobly worn,—
So rare the gems the robes adorn,—
As never yet so fair was born.

Along with her the angels were,
Archangels stood beside her there;
Round about the tumbler group
To give him solace, bring him hope;
And when round him in ranks they
stood,
His whole heart felt its strength renewed.

So they in haste to give him aid
Because their wills are only made
To serve the service of their Queen,
Most precious gem the earth has seen.
And the lady, gentle, true,
Holds in her hand a towel new;
Fans him with her hand divine
Where he lies before the shrine.
The kind lady, full of grace,
Fans his neck, his breast, his face!
Fans him herself to give him air!
Labours, herself, to help him there!
The lady gives herself to it;
The poor man takes no heed of it;
For he knows not and cannot see
That he has such fair company."

"Beyond this," continues Henry Adams, "we need not go. If you cannot feel the colour and quality—the union of *navet  * and art, the refinement, the

of the latter, more pleasing type as 'sublimation'—does not matter here; in both cases we may miss, if we envisage primarily the mode of outward behavior and the institutions to which it gives rise, the physiological significance of this group of counsels. Indeed, in the end, no particular form of outward behavior, individual or instituted, constitutes a necessary condition for the fulfillment of the counsel. The fulfillment is a matter primarily of achieving a certain mental attitude and a certain organic tuning or set, different from the one which is basic to physiological reproduction. If there has come to be placed upon these counsels sometimes a signification as of a 'renunciation' that in many civilizations has had its counterpart in certain instituted practices of the outward life, that signification is an accident of history. For the relevant counsels in some of the more highly elaborated religious traditions make, as does the Indic, specific provision for an appropriate time within the life-cycle of the individual for the development of this attitude—a period preceded by the regimen of a life of parenthood, of 'householding' and of 'worldly affairs.' In the Christian tradition, there is no such provision, but the instituted celibate state of priest and monk must not—though this implies no criticism of these instituted elections—mislead

infinite delicacy and tenderness—of this little poem, then nothing will matter much to you; and if you can feel it, you can feel, without more assistance, the majesty of Chartres.' The quotation is here given at some length because in it Adams has succeeded so admirably in limning for us, by his choice of passages and by his comment, a type of attitude and of behavior characteristic of that time. There is indeed no need of assuming that those centuries were a golden age, in order to appreciate the quality of their *Zeitgeist*; and without implying that we, the heirs of the Reformation and of the *Aufklärung*, would turn backward the flight of time, we may yet pause to consider whether those centuries, which could entertain, in all simplicity, such a sympathetic appreciation for the type of behavior described in the ballad, did not, perhaps, participate in a greater measure of freedom in this respect than does our own, in which certain conceptions of the 'normal' and 'abnormal' have achieved such overwhelming influence in the group mind.

us as to the general spirit that, even after such changes as the rapidly growing ecclesiastical system may have introduced into the canon, still emanates from the central theme. For it is of the very essence of the Gospels that their central drama emphasizes everywhere the inwardness of the proffered grace that waits not upon outward circumstance. We are there counseled explicitly to seek an inward kingdom and all other items in life will fall into their appropriate places. We need not labor this point at the hand of illustrations. Its bearing upon the question of the physiological basis of the religious life is patent. There is here every indication that the counsel grows out of a deep appreciation of an important problem, but whatever interpretation may have been put upon it in the course of the history of human culture, there is no necessary implication in this counsel that the overt sexual response is either to be disguised by the fiction of a 'sublimation'—that is to say, given the appearance of being something else, after the manner of some of the psycho-analytic procedures—or to be 'repressed,' *i.e.*, eliminated after the manner of the Tolstoyan doctrine. The author of *The Forgotten Threshold*,¹¹ a valuable individual record of religious experience, remarks, "The object of asceticism is generally misunderstood, particularly in one phase of its endeavors—to forget the body. The truth of the matter is that the flesh and blood in their highest song toward which we should strive are so occupied with praising God that they completely lack self-consciousness, and do not distract the intellect or the will." Despite its poetic form, the statement points to the simple fact that there may be times when the organism is not keyed for the process of germ-cell production, and that then a process physiologically opposed to it may set in, involving not

¹¹ *The Forgotten Threshold: A Journal of Arthur Middleton*, New York, 1919, p. 68.

only the action of the interstitial cells of Leydig but also the induction of a specific tuning of the entire viscera.

To induce this visceral state by controlling variously either the perceptual and ideational processes or the attitudes registering in the life of feeling and desire, and thereby to replace the catabolic tension-state which is characteristic not only of anger and of libidinous desire, but also of anxiety and worry over the thousand and one things men set their minds and hearts upon—this is, as a matter of fact, the physiological index of achievement with reference to most of these counsels. And if the recommendation of fasting also has been found, at times, pragmatically useful toward that end, so too has been that other instruction, "Make thy mind as a quiet pool in the moonlight!" If, however, one were to subject these procedures to further analysis, which lies outside the scope of the present essay, it would become apparent that they look, functionally, beyond inhibition of certain physiological processes, and beyond the stultification of the mental life that superficial observers have seen implied in the type of instruction last mentioned. To put to rest the wearisome questioning of the mind is not a merely negative process. It may arise spontaneously in the individual, as in certain forms of 'religious awakening,' or it may be inaugurated by him as part of a technique of control; but however brought about, the elimination that it involves of the state of secondary attention with its many foci and with its conflict of many impulses, apparently constitutes a condition for inducing widespread modification of mental and bodily processes. The instruction is simple: "Be still." It is the distinctive psychological mark of the procedure in the Central Action of the ritual of the historic Church. Without prejudice either for or against the metaphysical postulate implied in that

action, we may observe that the instituted procedure here clinches the foregoing instruction with supreme economy. In the light of this psychophysiological technique, the recommendation not to trouble and vex the understanding concerning recondite things, constitutes but a preparation for participation in the Central Action. And if we leave aside explicitly once more the question of the Church's doctrine concerning the Bodily Presence in the Eucharist, there are obviously given here the conditions on the bodily side that favor, for a brief space at least, the organic patterning in which there may be released those anabolic processes which tend under ordinary conditions of restless striving or of anxiety or fatigue to be inhibited. This eliciting of the bodily response under these conditions constitutes a real physiological change in the organism, and in that sense at least—and without prejudice either for or against any other sense in which the subject might be approached—there is wrought in this ritualistic procedure a chemical change, a real transubstantiation within the body of the participant.

And who shall say what might result from this type of procedure if the conditions were such that it might have full sway, or if, in the course of history or in the course of the development of the individual, there would not set in once more the tendency to vex the mind and wear out the heart? But we know that worry and anxiety tend to become the permanent habitus of the individual and of the time—and this habitus functions in inhibiting the processes that become, in the terminology of Thomas à Kempis, the vehicles of the ancient grace. It is then that, through procedures such as these—couched sometimes in physiological, sometimes in psychological terms, as the counsel to fast or the instruction to make the mind “as a quiet pool in the moonlight”—that mankind may seek to enter upon a technique of control of psychophysiological

processes. And there are intimations that in such techniques as these mankind has come repeatedly upon a phenomenon that, both as 'inward experience' and as physiological process, serves at least to point in the direction of the possibility of some radical psychophysiological change in our humanity.

The study of the first hand accounts and, more particularly, of the occasional indications of an inducting technique has brought us a measure of understanding with respect to the psychological nature of such an experience, its physiological significance for the health of the body, its place in the biological process, its relation to the strain of the economic life, and its relation to the crises of human history as the parallel of ecological crises; and this study opens the way also to the hypothesis that if a shift of psychophysiological functioning with reference to the neuro-glandular balance that is represented by this experience, may thus replace, even at the level of biologic adjustment, weariness with *élan*, strain and anxiety with poise, by unsealing the springs of healing that flow for him in whom the physiological set inhibiting those springs is overcome,—then further modifications of these underlying neuro-glandular processes may be postulated as the correlates of further possible development of attitudes and functions, that might conceivably take place beyond the stage to which we have followed them in this study.

Ours was the task to spell, in part, the runes of these, our days; to search, not the constellations of the stars, as did the astrologers of old, for the signs of human destiny, but the operation of the organic processes that in their weaving give pattern to the lives of the children of men. We see that, in so far as man comes to understand those processes within himself that weave his destiny, he enters into just that measure of possible control. And if he—

continuing, in these latter days, the ancient quest for the fountain of youth—has discovered the processes of regeneration within himself, it augurs the day when he will see that these processes are the bodily correlates of what he knows directly as attitudes of mind. He may then become, in part, the author of his being. Every vision of human excellence, every response—whether of acceptance or rejection—to some possibility of human experience, every participation in the inner meaning of some personality that may be revealed to him,—all these are continually entering into the pattern of his being. No modes of experience, no traits of character, really foreign to his humanity, will be ‘acquired’; but once he is master in his house he may discover possible modes of experience of which hitherto he had not even dreamed—the possibilities of a humanity that might perhaps fare forth on the adventure implied in the words: “Seek ye first the Kingdom of God and His righteousness; and all these things shall be added unto you,” the direction which such an adventure would take being clearly indicated: “for, behold, the Kingdom of God is within you.”

EVOLUTION AND THE HUMAN HOPE

THIS brings us full circle in the consideration of our problem. We saw how the naturalistic point of view and the scientific method may have operated at times in creating a psychophysiological set that functions in inhibiting the operation and development of other sets that might be shadowed forth in the vision of Humanity Transfigured, perhaps, or other such. Not that any particular form of such possible humanity is hindered, but that the inquisitive and critical attitude functions in detaching, from the objects examined in the scientific quest, the usual habituated and hereditary reactions to them. It is thus that in the scientific attitude, the individual might become almost completely alienated from the traditional and even from some of the presumably biologically inherent tendencies to respond. Hence the caricatures of the scientific man, current a quarter of a century ago: absent-minded, awkward of movement, unfamiliar with the socially current humor, because unacquainted with the socially established reactions about which the humor plays, or even because oblivious to the more fundamental biological significance that is attached to situations by the ordinary human being. In such a one, caught by the desire to know some particular field of science, other impulses and behavior-tendencies, and other modes of affective response are at a disadvantage, and development at these points is to that extent unlikely. The person in whom such differentiation has set in, would tend therefore to fail to participate in that 'understanding' that would belong to those in whom the other trends have not been placed at such disadvantage. And so far as the apprehension of the vision of Humanity Transfigured

involves those other fundamental constellations of the organic processes, that vision is closed so long as those constellations are inhibited. But this outcome is not necessary, nor even usual.

The difficulty may be, however, not that the scientist has worked perseveringly and has had a measure of success in his endeavors to give us a description of the 'world' as it is apart from the operation of the motives represented by other action-trends, but that humanity does not inquire assiduously into the grounds of its own nature whence arise all motives. Individual man lives a life whose pattern is largely imposed upon him from without, not merely with respect to economic circumstance, but at every point. Robert Louis Stevenson in his essay, *Virginibus Puerisque*, whimsically suggests that, even at the point of the fundamental biological function, the process of choice is carried on in terms of the fashions rather than of the deep-moving impulses that might come to flower in that understanding of the meaning of human personality that constitutes love. And when the individual gets tied in a knot and becomes sick by reason of the impossibility of conforming to all the outward demands of the economic and social life, he does not always set to work to unravel the threads himself, but he may go to have himself psychoanalyzed for a consideration. But not until he sets to work and aggressively explores that inner world in which are reflected the operations of the processes which the biologist has unravelled—explores them not for purposes primarily of scientific statement, but for the purpose of that 'understanding' that is at once knowledge of, and participation in, the meaning of life, will he create in himself the conditions for release of those processes that shall bring not only healing to the body but light to the mind. We say *create* these conditions—the conditions which, we saw, in the course of our study, arose sometimes spon-

taneously in the individual. That the reinstatement of these conditions has been deemed possible has been attested by the records and by the extant techniques, the essence of which is the induction of a state of quiescence of the habituated and impulsive action-trends. In this respect the technique has a point in common with that of the scientific quest. The difference between the two might ultimately be stated as being one concerning the nature of the objects that become known rather than as a difference of method. But if the scientific attitude is individual to few, and the espousal of the scientific quest equally rare, the initiative and independence that is requisite for this other quest would appear rarer still in our contemporary world. In the end, however, it is not the emphasis upon the scientific method and the outward direction given to attention in the naturalistic point of view, that militate against the prosecution of this other quest, but certain factors within the individual himself, some of which have come to light in the course of this study and indicate that many organic inhibitions interpose themselves.

Yet, on the other hand, quite apart from actual individual achievement in this other quest, a problem of physiological adjustment comes to be felt when from time to time the race has created a situation in which the physiological organism is kept in the catabolic or depressor state by the continued operation of economic, or social, or political strain. The interpretation arises that this situation may function as an ecological crisis in the life of the species, and we saw that adjustment often occurs spontaneously in the organisms of the harassed humanity. And such spontaneous adjustment involves then, physiologically,—whatever else it may involve—one of the very processes that the instituted practices of healing sometimes aim at also in their attempt to deal with the situa-

tion. And this common item is the favoring of the anabolic functions to replenish the waste due to anxiety and fear and exhaustion. But the healing which is offered is often but an ameliorative measure. It does not meet the real problem of humanity in such a crisis. It is at such times that the race may turn again in the direction of the ancient expectation of a savior, or it may attempt, here and there, to renew commerce once more in the ancient magic. The instituted sources of healing and of hope have seemed to some to fail them in their hour of need.

Such failure, now as in other similar situations in human history, becomes significant in the light of the latter-day emphasis upon the doctrine of 'social evolution' that is supposed to have replaced physiologic evolution in the human world. It is in the wear and tear of the instituted processes of the economic and social life that the ground is prepared for these crises. And a survey of the measures proposed for meeting the crisis—such as racial segregation, lethal chambers for the 'dysgenic' or 'cacogenic,' enforced restriction of fertility, amelioration of the effects of industrial methods upon women and children—reveals the fact that they all partake, in general, of a negative, restrictive character. The facts indicate that it is not in such instituted procedures as these, but in the dialectic of the basic physiological processes under the strain of an ecological crisis, that the leaves may be put forth that shall be for the healing of the nations.

This new envisagement of the life of man—his origin, his history—in the light of this dialectic of the physiological processes, and the contemplation of his possible destiny from the point of view of physiological instead of institutional readjustment, brings us back to the heuristic significance of the central implication of the hypothesis of biologic evolution. That implication has become obscured by reason of the assumption, sometimes tacit,

sometimes overt, that the process of physiologic evolution has come to its term in man. This assumption of Biologic Finalism is not in accord with the evolutionary doctrine. One may leave aside the ancient metaphysical questions which play about the difference between an 'evolution' that means observable changes in biologic history, that on some criterion or other, like differentiation of physiological function, show progressive development as adjustment to changing circumstances, and an 'evolution' that is but the becoming explicit of that which is, perhaps, eternally implicit. Either of these metaphysical viewpoints, which are implied already in Aristotle and in Plato, respectively, may be entertained without prejudice to the empirical data. Both views must face the fact that life goes on, either as continued adjustment or as the unfolding in time and space of that which is prepared for. And, moreover, it is the mark of our own latter-day doctrine that it has couched the conception of evolution in such a way that it includes man in the sweep of the ongoing life-process in a manner which emphasizes not alone the whence of humanity, but raises also the question: Whither?

A survey of the relevant facts of physiology, of psychology, and of history, indicates that the process, whether conceived as adjustment or as unfolding, goes on still; and that the organic modifications that appear as indices of such adjustment or of such unfolding, may be stated—as are the species-variations that are already laid down in biologic history—in terms of modifications of anatomical structures and of physiological functions. Such variations involve first of all a somewhat different patterning of known processes, and by implication they may be found ultimately to involve modifications in the functions determining the internal chemical balance of the organism by means of endocrine processes. Such modifications,

when they appear, manifest themselves primarily in the changed attitude of the organism, indicated, for example, in the change from despair to hope, from anxiety to enthusiasm. The data of contemporary physiology and psychology imply, moreover, that it is in modifications of these functions that there resides the bodily basis for all the subtle variations in human character. And finally, just as partial destruction, for instance, of the suprarenal cortex is accompanied by a modification of some of the so-called secondary sexual characteristics, such as pitch of voice, so, too, modification of the manifold interrelations of these functions determines changes not only of behavior and feeling-tendencies of the most far-reaching sort, but determines also the development and growth of the bodily structures. The discovery of what these possible modifications may be, would become the task of the physiology of the future, as would also the question of their relation to heredity. The significant thing for the present human situation, however, is that these physiological modifications are to be inferred from the facts of mind and behavior in which human character is reflected. Here, then, is the locus of actual or possible modifications of physiological functioning that might result in an organization as different from present humanity as that is different from the iguanodon of Tyndall's comparison. In its loss of Tyndall's largeness of vision and in its neglect of these provocative biological facts our contemporary Naturalism has failed to attach to itself in the men and women of our age that attitude of expectancy—the physiological kin of enthusiasm, faith, and hope—that logically might have been claimed for it by reason of the implications of its central hypothesis of biologic evolution.

Yet, curiously enough, it is these neglected implications for the future of humanity that would seem to lie nearest

the surface when one turns to an envisagement of the biological significance of the data of science. Latterly the studies in the constitution of the germ-plasm as the carrier of the constellation of the 'traits' passed on to the next generation, are pointing in the direction that the temporary balance of the organic and chemical processes in the body is part-determiner of the particular constellation appearing in the germ-cell; the character of the offspring may come therefore to be in part determined by the mood, the feelings, the organic trends in impulse and desire, that enter at the time into the constellation of dominant character-traits in the parental organism. This physiological conception is portentous in its possible bearing upon human striving and human destiny. One recalls the mystery that—it is said—may be revealed to the pure in heart: if mankind loved and desired, in every fiber of its being, Humanity Transfigured, then the new Humanity will come to dwell in human flesh. And if the reader will pause awhile he may see in these physiological conceptions, here shadowed forth, an intimation also of the mystery of the Redemption: that if humanity receives into its heart of hearts the vision of that Other Humanity, a change is wrought in the bodies of them who thus receive. . . .

Such are the mysteries that are, at times, revealed in the hearts of the simple and the unlearned, and that anticipate in substance the new knowledge of the body. They are essentially mysteries of generation and of regeneration, of hope and faith, and of the charity of the strong.

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